

Article

Religious Diversity Predicts Religions' Population Growth in Tighter (vs. Looser) Cultures: A Study of Personality & Self-Reported Religion across 111 Countries

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Abstract: It is unclear whether religious affiliations and non-affiliations might grow differently in specific cultural environments populated by individuals with a particular personality profile, or how religious diversity in society might influence such growth. In the present study, mixed-effects analyses of moderated mediation conducted on online data collected from 111 countries (Valid $N = 52$) and across 4270 individuals (Valid $N = 3632$) showed that personality factors (Extraversion, Conscientiousness, and Agreeableness) could predict religiously affiliated populations growing faster between the years 2000 and 2015 in tighter (vs. looser) countries, which strictly impose social norms and have a low tolerance for deviant behaviors. This finding suggests that religious affiliations and non-affiliations might grow together in moderately tight-loose countries, supporting religious-secular pluralism. Moreover, the faster growth of religions in tighter cultures was stronger in countries ranking higher on the Religious Diversity Index (RDI), showing that all varieties of religions and faiths might become useful in tighter cultures for keeping an interest in religion alive among individuals with distinct personality profiles while ensuring the pervasiveness of social norms in society, toward furthering multi-religious pluralism and the growth of religious affiliations.

Keywords: religious affiliation/non-affiliation; personality; tighter vs. looser cultures; population growth; religious pluralism



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1. Introduction

Early social theories, such as earlier versions of the secularization hypothesis (Wallace 1966; Wilson 1966), predicted the decline of religions with the emergence of global modernization and urbanization. However, recent population growth trends (Johnson and Grim 2013) show faster growth of religiously affiliated than non-affiliated individuals worldwide. The lack of a decreased interest in religions in recent decades raises the question of whether religious diversity might play a facilitatory or inhibitory role in the growth of religiously affiliated populations (Chaves and Gorski 2001; Finke and Stark 1988; Gorski and Altnord 2008; Stark et al. 1995). The present study focuses on the personality and cultural profiles of religiously affiliated and non-affiliated individuals to better understand how religions might grow today and whether this growth is compatible with the greater or lower religious diversity of countries.

Both personality and culture play a role in predicting whether individuals will affiliate or not affiliate with a religion. For example, where relatively more religious people live, Agreeable and Conscientious individuals tend to be religious (Gebauer et al. 2014). Similarly, in regions with fewer religious people, Openness to Experience as a major personality factor predicts being less religious. Religiosity, in turn, predicts affiliating with religions, such as with a particular religious denomination (e.g., Catholic, Protestant) (Shahabi et al. 2002). Thus, personality can interact with culture to predict religious affiliations/non-affiliations. However, religious affiliations can also constitute a communal identity independently of personality but as part of one's community culture. For instance, on the Aspects of Identity Questionnaire (Cheek et al. 1994), individuals indicate on a 1–5 scale how important

religion, race, and ethnic identity are to their sense of who they are as a measure of their collective identity. In Identity Style Inventory—Version 5 (Berzonsky et al. 2013), collective identity attributes such as family, religion, and ethnicity help to measure the normative identity style.

We can best understand the *dual* nature of self-reported religion as cultural/communal identity vs. personality by studying its possible connection with a recently proposed cultural dimension that overlaps with personality, tightness vs. looseness (Gelfand et al. 2011). Societies that strictly impose social norms with a low tolerance for deviant behaviors rank higher on a scale of tightness (vs. looseness) across the globe or within a country across its regions (Gelfand et al. 2011; Harrington and Gelfand 2014). Countries like China and Germany, and U.S. states like Alabama and Oklahoma, rank higher on tightness. In contrast, countries like Spain and Brazil, and U.S. states like California and Florida, rank higher on looseness. Tightness (vs. looseness) predicts population density and scarce resources in a society with relatively greater natural or human-made disasters, disease threats, and territorial conflicts in its history, necessitating stricter rules and punishments for those who violate social norms.

Individuals in tighter (vs. looser) cultures are relatively more Conscientious and less Open to Experience (Gelfand et al. 2011), a personality profile that predicts being religious (Gebauer et al. 2014). The tendency to be religious or identify with a religion at an individual level in tighter cultures might interact with other features of tight cultures to predict the spread of religions at a societal/population level. For example, tighter cultures might be “more religious, thereby reinforcing adherence to moral conventions and rules that can facilitate social order and coordination” (Gelfand et al. 2011, p. 1101).

Tightness–looseness relates to the “predominance of strong vs. weak situations in everyday life” (Gelfand et al. 2011, p. 1101). Strong situations restrict the number of situationally appropriate behaviors, while weak ones allow for a wider range of responses from which an individual can select. Once a collective—religious (e.g., Christian) or non-religious (e.g., ethnic, racial)—identity becomes prevalent, a specific set of cultural norms may emerge for a broader range of social situations. On the other hand, religious affiliations have grown faster than non-affiliations in recent decades worldwide (Johnson and Grim 2013), becoming a valuable tool in tighter cultures to define “moral norms” (Gelfand et al. 2011, p. 1101) across social contexts. Critically, some tightness–looseness scale items measure “the degree to which social norms are pervasive” (Gelfand et al. 2011, p. 1102), suggesting that the growing prevalence of religious identities across the globe in recent decades might covary with tightness–looseness across societies. Specifically, tighter cultures might further facilitate the ongoing growth of collective identities, such as religious ones, in recent decades (Johnson and Grim 2013). In relatively looser cultures, religious affiliations might be growing somewhat slower or might not be growing.

Notably, there has been an ongoing debate in the sociology of religion about whether religious diversity or pluralism in society predicts decreased or increased affiliation with religions or religious denominations (Finke and Stark 1988; Chaves and Gorski 2001). One can think that a lack of decreased interest in religions, disconfirming the original version of the secularization hypothesis, can lead to greater religious participation when there are many as opposed to few religions and faiths in society because the supply side of religious products will then better meet the demand for them (i.e., religious economies model) (Finke and Stark 1988). However, there is mixed evidence for this prediction, with some studies supporting it (Finke and Stark 1988; Stark et al. 1995) and others finding little evidence (Chaves and Gorski 2001; Gorski and Altnordu 2008).

From the perspective of personality profiles interacting with culture to predict religious affiliations rates, however, we may think that religious diversity will become helpful in tighter cultures to maximize the pervasiveness of social and moral norms in society. Although one dominant faith in society might ensure the pervasiveness of social norms, it might fall short of appealing to all individuals with distinct personality profiles. Therefore, a greater variety of religions and faiths might be more helpful in tighter cultures to maxi-

mize the pervasiveness of common social norms. In this proposed personality $\times$ culture interaction model, unlike the religious economies model (Finke and Stark 1988; Stark et al. 1995), religious diversity does not predict increased religious affiliation in society without functioning in a tight culture to ensure the pervasiveness of social norms. Religious diversity can predict increased religious affiliations more strongly or only in relatively tighter (vs. looser) cultures.

For example, Casanova (2018) observed simultaneous changes in Latin America's recent population growth trends reported by Pew Research Center (2014b) toward an increasing Protestant/Catholic ratio and religious non-affiliation rather than affiliation rates in recent decades. This pluralization, associated with a simultaneous increase in religious non-affiliations rather than affiliations, might partially relate to culture because Latin American countries are primarily loose cultures (Gelfand et al. 2011), where religious non-affiliations might grow faster, as discussed above, while religious affiliations might replace one another without increasing in general. On the other hand, Casanova (2018) also observed failed attempts in China and Vietnam, relatively tighter cultures (Gelfand et al. 2011), to stop the growth of religious affiliations in recent years. Therefore, the possible growth of religious affiliations in tighter and non-affiliations in looser ones today might be compatible with two types of pluralism: multi-religious and secular-religious pluralism, where different types of both religiously affiliated and non-affiliated populations can co-exist in society.

The present study is a secondary data analysis testing the hypothesis that religious diversity, which can be an indicator of the concentration of many rather than a few religious affiliations or non-affiliations in a country (Johnson and Grim 2013), can predict the increased growth of religiously affiliated populations in tighter (vs. looser) countries between 2000 and 2015. As shown in Figure 1, personality might predict affiliation with a religion, with a country's tightness (vs. looseness) serving as a possible moderator of this relationship. As a result, religious affiliations might spread faster across populations in tighter (vs. looser) countries. Notably, this population growth trend might be stronger or only exist in countries ranking higher rather than lower on the Religious Diversity Index.

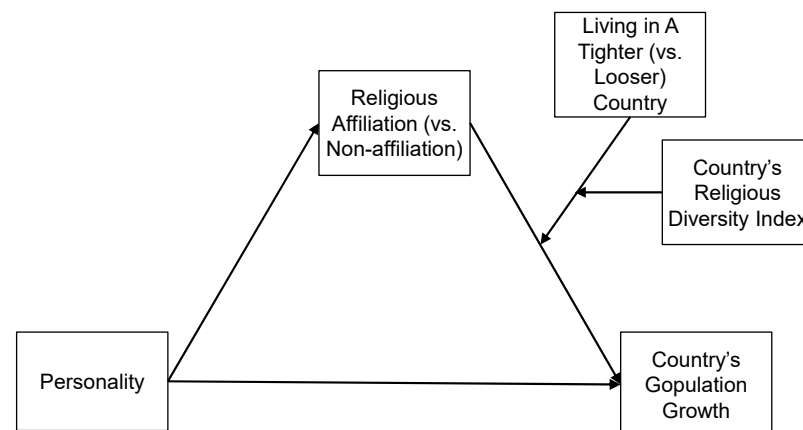


Figure 1. A model of personality $\times$ culture interaction in the growth of religious affiliations (vs. non-affiliations) in tighter (vs. looser) and religiously diverse countries.

2. Results

Correlations among important study variables appear in Table 1. Among the bi-variate relationships with at least a small effect size according to Cohen's (1988) conventions ($|r| = 0.10$) were the expected associations between tightness (vs. looseness), on the one hand, and on the other hand, religious affiliations (vs. non-affiliations), population growth, and decreased Openness to Experience (Gelfand et al. 2011; Harrington and Gelfand 2014). Religious diversity correlated with fewer religiously affiliated individuals in a country, greater tightness, and increased population growth. Religious affiliations (vs.

non-affiliations) also correlated with population growth, Conscientiousness, Agreeableness, and decreased Openness to Experience. Population growth correlated with Openness to Experience. Neuroticism was negatively correlated with all other personality factors. Openness to Experience correlated with Extraversion and Agreeableness. Conscientiousness correlated with Agreeableness.

Table 1. Correlations among study variables of bivariate relationships with at least a small effect size appearing in bold.

	1	2	3	4	5	6	7	8	9
1. Religious Affiliations (vs. Non-affiliations)	1	0.138	−0.110	0.159	−0.174	0.135	0.092	0.176	−0.058
2. Country's Tightness (vs. Looseness)		1	0.187	0.455	−0.107	−0.012	−0.029	−0.036	0.016
3. Country's Religious Diversity Index			1	0.110	−0.042	−0.039	0.002	0.019	0.003
4. Religion's Population Growth In A Country				1	−0.107	−0.005	−0.024	−0.041	0.014
5. Openness to Experience					1	0.075	0.194	0.139	−0.105
6. Conscientiousness						1	0.083	0.159	−0.241
7. Extraversion							1	0.299	−0.250
8. Agreeableness								1	−0.106
9. Neuroticism									1

2.1. Personality $\times$ Tightness (vs. Looseness) Interaction Effects

Following guidelines (Zuur et al. 2010) for the visual inspection of model residuals as a definitive test for the homogeneity of variances, the examination of normal Q–Q plots for outcome models (see the Section 4 below) with a group-level dependent variable (religions' population growth rates in a specific country) indicated no skewness. Plotting fitted values against residuals in the same models showed evenly distributed residuals around zero. Therefore, the random intercepts analyses could proceed as specified in Section 4 below.

Mediation analyses for mixed models (Tingley et al. 2014) used Monte Carlo methods with 1000 simulations to test personality factors' effects mediated through affiliating (vs. not affiliating) with religions on religious affiliations' (vs. non-affiliations') population growth rates. One set of moderated mediation analyses tested the mediation effects at one standard deviation below ($M - SD = -0.38$) and above ($M + SD = 0.50$) the mean tightness–looseness scores across countries ($M = 0.06$), with different proportions mediated at high vs. low tightness–looseness levels indicating a meaningful effect (Ananth 2019). Another set of moderated mediation analyses tested if the possible moderated mediation effects with tightness–looseness as the moderator might exist at one standard deviation below ($M - SD = 0.73$) and above ($M + SD = 5.04$) the mean Religious Diversity Index of countries ($M = 2.89$, $SD = 2.15$).

As shown in Figure 2, all personality factors except Neuroticism had a significant effect when mediated through religious affiliations (vs. non-affiliations) on population growth rates (Mediation effect b 's = 0.06, -0.16 , -0.09 , and -0.21 , with 95% CI's = [0.04, 0.09], $[-0.23, -0.10]$, and $[-0.15, -0.03]$, $[-0.26, -0.16]$, and p 's < 0.01, for Openness to Experience, Conscientiousness, Extraversion, and Agreeableness, respectively). Openness to Experience predicted a decrease ($\Delta R^2 = 0.05$), and the other three factors (ΔR^2 's = 0.02, 0.01, and 0.03 for Conscientiousness, Extraversion, and Agreeableness, respectively), an increase in affiliating with religions that, in turn, predicted reduced population growth rates as a main effect ($\Delta R^2 = 0.11$) independently of cultures.

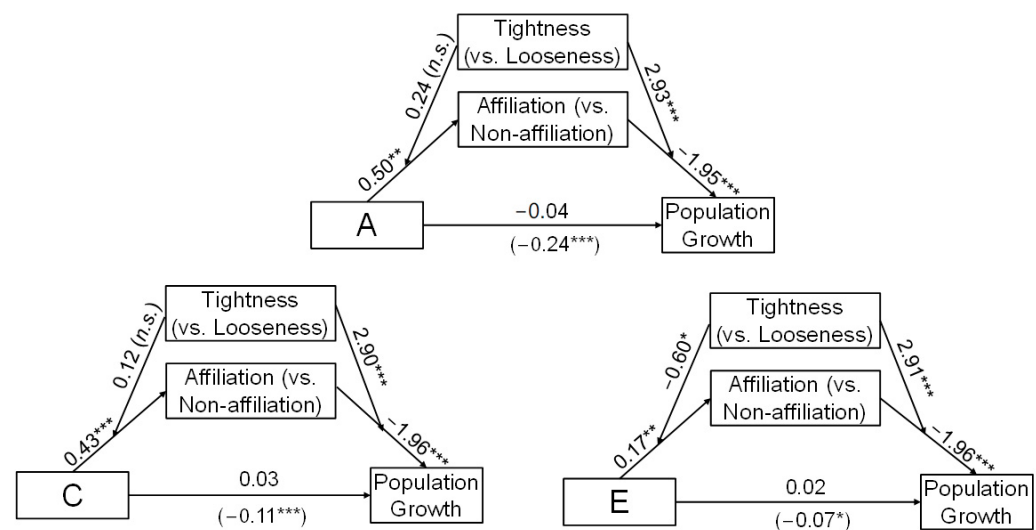


Figure 2. Mediation and tightness–looseness moderated mediation effects in random-intercept models; O: Openness to Experience; C: Conscientiousness; E: Extraversion; A: Agreeableness; ***: $p < 0.001$; **: $p < 0.01$; *: $p < 0.05$; n.s.: $p > 0.1$.

As shown in Figure 2, most mediation effects were further moderated by the countries' tightness–looseness. Conscientiousness (Proportion mediated b 's = 1.16 vs. 0.43, with 95% CI's = [0.76, 2.41] vs. [−6.1, 6.18], and p 's = 0.016 vs. 0.654, in looser vs. tighter countries, respectively), Extraversion (Proportion mediated b 's = 1.26 vs. −0.02, with 95% CI's = [0.89, 2.52] vs. [−1.56, 2.11], and p = 0.008 vs. 0.880, in looser vs. tighter countries, respectively), and Agreeableness (Proportion mediated b 's = 0.92 vs. 0.28, with 95% CI's = [0.67, 1.50] vs. [−1.23, 3.15], and $p < 0.001$ vs. p = 0.130, in looser vs. tighter countries, respectively) predicted religious affiliations with relatively lower population decline rates in relatively tighter countries. The mediated effect of Openness to Experience did not vary as a function of tighter vs. looser countries (Proportion mediated b 's = 1.97 vs. −0.01, with 95% CI's = [−25.15, 26.92] vs. [−0.33, 0.32], and p = 0.414 vs. 0.802, in looser vs. tighter countries, respectively). The direct positive effect of Openness to Experience on population growth was only significant in looser countries (Direct effect b 's = 0.05 vs. −0.02, with 95% CI's = [−0.22, −0.001] vs. [−0.07, 0.18], and p = 0.046 vs. 0.790, in looser vs. tighter countries, respectively).

2.2. Personality $\times$ Tightness (vs. Looseness) $\times$ Religious Diversity Interaction Effects

For the three personality factors that showed a significant moderated mediation effect, Conscientiousness, Agreeableness, and Extraversion, the effect was further moderated by the countries' Religious Diversity Index, as shown in Figure 3. In countries ranking relatively higher on the Religious Diversity Index at one standard above the mean, Conscientiousness (mediation b 's = −0.30 vs. −0.01, with 95% CI's = [−0.40, −0.18] vs. [−0.04, 0.02], and $p < 0.001$ vs. p = 0.520, in looser vs. tighter countries, respectively), Extraversion (mediation b 's = −0.18 vs. −0.01, with 95% CI's = [−0.28, −0.07] vs. [−0.02, 0.01], and $p < 0.001$ vs. p = 0.540, in looser vs. tighter countries, respectively), and Agreeableness (mediation b 's = −0.38 vs. −0.01, with 95% CI's = [−0.48, −0.28] vs. [−0.04, 0.02], and $p < 0.001$ vs. p = 0.580, in looser vs. tighter countries, respectively) predicted religious affiliations with relatively lower population decline rates in relatively tighter countries. In countries ranking relatively lower on the Religious Diversity Index at one standard deviation below the mean, Conscientiousness (mediation b 's = −0.02 vs. −0.04, with 95% CI's = [−0.07, 0.03] vs. [−0.10, 0.01], and p 's = 0.490 vs. 0.134, in looser vs. tighter countries, respectively), Extraversion (mediation b < −0.01 vs. mediation b = −0.03, with 95% CI's = [−0.03, 0.03] vs. [−0.08, <0.01], and p 's = 0.910 vs. 0.062, in looser vs. tighter countries, respectively), and Agreeableness (mediation b 's = −0.01 vs. −0.07, with 95% CI's = [−0.06, 0.05] vs.

[−0.14, <0.01], and p 's = 0.850 vs. 0.054, in looser vs. tighter countries, respectively) either failed to predict or predicted the population growth rates in a marginally significant way in tighter countries.

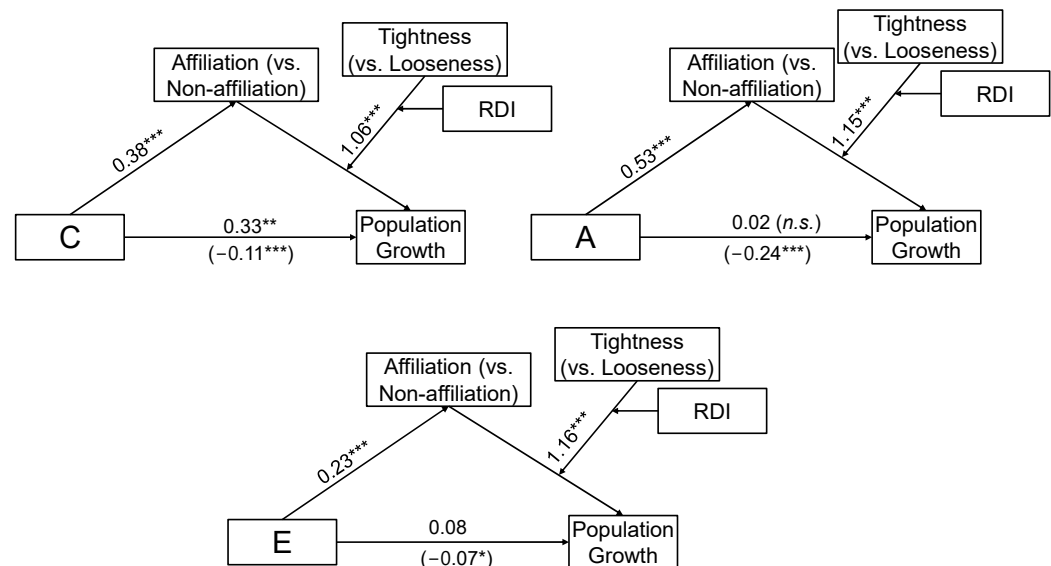


Figure 3. Tightness–looseness $\times$ Religious Diversity Index (RDI) moderated mediation effects in random-intercept models; C: Conscientiousness; E: Extraversion; A: Agreeableness; ***: $p < 0.001$; **: $p < 0.01$; *: $p < 0.05$; n.s.: $p > 0.1$.

3. Discussion

The results showed that personality factors, including Conscientiousness, Extraversion, and Agreeableness, predicted an affiliation with religions, predicting population growth rates in tighter (vs. looser) countries ranking higher on the Religious Diversity Index. In countries ranking relatively lower on the Religious Diversity Index, the personality–religious affiliation link either failed to predict (Conscientiousness–religious affiliation link) or predicted marginally significant population growth rates (Agreeableness and Extraversion–religious affiliation link) in tighter countries. Thus, religions' growth in tighter (vs. looser) countries was conditional on those countries ranking higher rather than lower on religious diversity.

The results suggest that the faster growth of religions in recent decades (Johnson and Grim 2013) is compatible with religious diversity, which in one way might emerge as secular–religious diversity and pluralism (Casanova 2018). Specifically, the present study findings showed that religions grew primarily in tighter countries, and non-affiliations in looser countries, between 2000 and 2015, suggesting that in the middle of the tightness–looseness continuum, religious affiliations and non-affiliations could grow together and support a religious–secular pluralism.

Both personality and culture are essential in predicting whether someone will affiliate with a religion. Being Agreeable and Conscientious predicts being religious, especially in countries and regions where relatively more religious people live, and Openness to Experience predicts being less religious where relatively few religious people live (Gebauer et al. 2014). Independent of spirituality, religiosity predicts religious affiliations such as affiliating with a particular religious denomination (e.g., Catholic, Protestant) (Shahabi et al. 2002), confirming the role of personality $\times$ culture interaction in predicting individuals' tendency to identify with a religion. The present study findings support this personality $\times$ culture interaction model by showing that Conscientious, Agreeable, and Extraverted individuals living in countries with relatively moderate tightness–looseness might tend to affiliate with religions at an individual level. Their affiliations, however, can only partially spread

in society, potentially supporting religious–secular pluralism in moderately tight–loose countries.

Notably, the results also showed that the faster growth of religions in recent decades (Johnson and Grim 2013) is compatible with multi-religious diversity. Specifically, the growth of religiously affiliated populations in tighter countries was stronger than weaker when religious diversity was high. However, in direct correlations (Table 1), a country's religious diversity was negatively rather than positively correlated with its sample's tendency to affiliate with religions. Therefore, religious diversity did not generally predict increased religious affiliation rates as predicted by the religious economies model (Finke and Stark 1988; Stark et al. 1995). The present study findings only partially align with religious pluralism predicting religious affiliation growth by showing that religious diversity might predict religious affiliation growth in relatively tighter (vs. looser) countries. Although one dominant faith in tighter cultures might help ensure the prevalence of social norms, it might fail to motivate everyone with different personality profiles and interests in religion. Therefore, a greater number of faiths in tighter cultures might function to maximize the prevalence of common religious norms in society (Gelfand et al. 2011), facilitating the growth of religious affiliations in those cultures.

Previous studies of micro- and macro-indicators of religiosity identified several religious-cultural zones worldwide (Asian religions, Islam, Catholicism, Protestantism, Orthodox Christianity, Judaism, and secularism), with secularism primarily emerging in Western Europe (Saroglou et al. 2020). The present study extends those findings by showing that religions might also become concentrated in tighter countries and secularism in looser ones. Furthermore, regardless of certain geographical hotspots of religions and secularism worldwide, religious populations might grow sparsely and broadly distributed in tighter (vs. looser cultures).

Tightness strongly correlates with dense networks with close friends ($r = 0.55$) as opposed to sparse networks with mere acquaintances (Liu et al. 2018). Dense networks in tight cultures help individuals overcome natural or man-made threats (Gelfand et al. 2011). On the other hand, sparse networks in loose cultures help individuals access valuable information and resources, such as helping them find a satisfying job (Granovetter 1973). Religious communities in tight cultures might thus function as dense networks protecting individuals in their fight for survival. The more such communities exist in tight cultures, the more useful they might be for survival.

For example, during the COVID-19 pandemic, tight countries had relatively higher survival and lower disease infection rates (Gelfand et al. 2021). In the early months of COVID-19 pandemic, Google searches for prayers increased by 30% relative to all other searches worldwide, indicating a possible global increase in religiosity (Bentzen 2021). However, at a close inspection of the data, this increase was most clearly and sometimes only visible in more religious countries with higher religious affiliation rates, higher earthquake risks, and greater socio-economic and political inequality, all indicators of tight cultures (Harrington and Gelfand 2014). Thus, the increase in religiosity after the COVID-19 pandemic might not undermine religious–secular pluralism, with religions growing relatively less quickly in loose cultures, showing instead the adaptive function of religious communities in tight cultures.

Finally, it is critical to note that the faster growth of religious affiliations today in tighter cultures, as reported in the present study, might be related to religious affiliations beginning to grow more quickly in the 21st century (Johnson and Grim 2013). Faster-growing religious identities in the 21st century might have become a valuable tool in tighter (vs. looser) cultures to define “moral conventions” across a broader range of situations (Gelfand et al. 2011, p. 1101). Future trends can emerge, shifting the weight in tighter cultures toward the faster growth of religious non-affiliations at a societal level, showing a possible new secularization trend. Shifting trends in religious affiliation/non-affiliation rates over specific periods and across cultures may constitute a future area of research. Future research might also use more nuanced measures of self-reported religion at an

individual level to detect different trends in the growth of religious affiliations and non-affiliations.

The results neither fully support the secularization hypothesis (Wallace 1966; Wilson 1966) nor the religious economies model (Finke and Stark 1988; Stark et al. 1995). Sparsely distributed religious populations might grow in tighter cultures, and the growth of religions in looser cultures might be limited. The results indicate a strong potential for a global increase in religious–secular and multi-religious pluralism.

4. Materials and Methods

4.1. Sample

An open-source data repository (https://openpsychometrics.org/_rawdata, accessed on 6 July 2017) had a dataset with 4270 people’s responses to the International Personality Item Pool Big Five scales (Goldberg et al. 2006). The data collection took place between 2011 and 2015 online through a website (<https://openpsychometrics.org>, accessed on 6 July 2017). Participants gave their informed consent after completing the tests. Specifically, survey-takers reported if their answers were accurate and whether researchers could use their data for scientific purposes. The dataset included only the accuracy-confirmed data.

Some primary demographics broken down by religious affiliations/non-affiliations appear in Table 2. Education levels and gender composition were not significantly different among the different religions. People affiliated with Christian denominations, Judaism, and no religion were mostly White. Participants in other categories were primarily Asian.

Table 2. Major sample characteristics by self-reported religious affiliations/non-affiliations.

	Religious Non-Affiliations		Religious Affiliations									
	Agn. ⁵	Athe. ⁶	Bud. ⁷	Cath. ⁸	Prot. ⁹	Mrm. ¹⁰	Chr. Oth. ¹¹	Hind. ¹²	Sikh	Mslm. ¹³	Jew ¹⁴	Oth. Rel. ¹⁵
N												
No. of People	620	658	105	835	445	41	658	173	19	227	58	371
No. of Countries	61	63	25	51	37	8	47	19	7	38	7	38
%												
Education												
LTHS ⁴	13.1	16.1	10.5	15.8	13.0	19.5	16.1	11.6	26.3	10.1	24.1	11.3
HS ³	41.9	42.7	46.7	47.5	37.8	39.0	46.7	22.5	21.1	36.6	34.5	50.4
Univ. ²	31.5	28.6	23.8	24.8	31.2	24.4	26.3	19.1	36.8	33.0	20.7	26.4
Grad. ¹	13.2	12.2	19.0	10.8	17.1	14.6	10.2	45.1	15.8	19.4	20.7	10.8
Total	99.6	99.5	100	98.9	99.1	97.5	99.2	98.3	100	99.1	100	98.9
Race												
Asian	9.2	9.3	62.9	17.8	13.7	7.3	5.9	84.4	89.5	52.4	3.4	11.6
Arab	0.6	0.2	1.0	0.7	0.0	2.4	0.5	0.0	0.0	22.0	0.0	0.8
Black	1.3	0.9	1.9	5.1	8.8	2.4	18.4	2.9	0.0	3.5	1.7	4.6
White	77.6	81.8	27.6	58.6	70.3	80.5	63.8	2.3	0.0	6.2	87.9	67.9
Other	11.1	7.8	6.7	16.8	6.3	7.3	10.2	10.4	10.5	12.8	6.9	14.6
Total	99.8	99.8	100	99	99.1	100	98.8	100	100	96.9	100	99.5
Gender												
Male	35.2	45.7	41.9	29.1	28.3	39.0	28.1	46.2	26.3	37.0	39.7	29.9
Female	63.4	53.3	56.2	70.1	71.5	61.0	71.4	53.8	73.7	63.0	60.3	68.7
Other	1.1	0.8	1.9	0.7	0.2	0.0	0.3	0.0	0.0	0.0	0.0	1.3
Total	99.7	99.8	100	99.9	100	100	99.8	100	100	100	100	100

¹: graduate degree; ²: university degree; ³: high school degree; ⁴: less than high school degree; ⁵: Agnostic; ⁶: Atheist; ⁷: Buddhist; ⁸: Catholic; ⁹: Protestant; ¹⁰: Mormon; ¹¹: Other Christian; ¹²: Hindu; ¹³: Muslim; ¹⁴: Jewish; ¹⁵: Other religion member.

4.2. Power Analysis

According to a similar study conducted worldwide, the median correlation between a personality trait factor and the critical dimensions of psychological constructs differentiating religious-cultural zones worldwide (Asian religions, Islam, Catholicism, Protestantism, Orthodox Christianity, Judaism, and secularism) was $r = 0.10$ (Saroglou et al. 2020). With a correlation coefficient of 0 under the null hypothesis and the minimum effect size of $r = 0.10$ ($\beta = 0.20$, $p = 0.05$), a Microsoft Excel Script (<http://www.real-statistics.com/free-download>, accessed on 6 January 2022) based on relevant guidelines (Zaiontz 2020) was used to calculate the minimum sample size as $N = 783$ for the testing of a two-tailed hypothesis. Thus, the sample size was adequate for Studies 1 and 2.

4.3. Measure

Participants rated ten items for each Big Five factor (50 in total) on a 1-to-5 scale. The dataset also had many demographic variables, including 12 self-reported religion categories (Agnostic, Atheist, Buddhist, Christian/Catholic, Christian/Mormon, Christian/Other, Christian/Protestant, Hindu, Jewish, Muslim, Sikh, Other). The most recent numbers of adherents of religions for each year between 2000 and 2015, broken down by countries, were available from the World Religion Project Global Religion Database (Brown and James 2019, accessed on 22 November 2022). The data collection took place between 2013 and 2017. Unlike the personality dataset with Agnostic and Atheist as the religious non-affiliations, the demographics dataset had one category of broadly defined Non-religionists, among whom were Atheists. Therefore, in the personality dataset, Agnostics and Atheists became a new category, which mapped onto Non-religionists in the demographics dataset. All other self-reported religion categories were the same between the two datasets, constituting 11 categories (Non-religionist, Buddhist, Christian/Catholic, Christian/Mormon, Christian/Other, Christian/Protestant, Hindu, Jewish, Muslim, Sikh, Other). The personality dataset also recorded participants' ISO country codes based on the technical information about Internet users' access to the personality test website. People from 111 countries completed online surveys. The following formula previously used by Johnson and Grim (2013) in their demographic analysis of religions' population growth rates helped to calculate the 15-year annual growth rate (from 2000 to 2015) of 11 affiliations/non-affiliations for each of the 111 countries in the personality dataset:

$$\left[(\text{Adherents 2015} / \text{Adherents 2000})^{1/15} - 1 \right] \times 100$$

The tightness-looseness scores for 57 nations were available from Gelfand et al. (2021). Following the guidelines in calculating The Herfindahl–Hirschman Index, a widely accepted measure of concentration (Johnson and Grim 2013) was used to calculate the Religious Diversity Index for 232 countries, the data of which were available from the Pew Research Center (2014a).

4.4. Data Analysis

Random-intercepts models included participants' countries as the grouping variable. Calculations used REML estimation. The religions' 15-year *annual population growth rate* in a specific country from 2000 to 2015 was a group-level dependent variable, which, as described earlier in the Section 2, did not violate the model residuals' normality assumptions across countries as the grouping variable in the analyzed linear mixed models. There were two random intercepts models across countries for testing the moderated mediations shown in Figure 1 for five personality factors: Outcome and Mediation Models. For example, for Openness to Experience interacting with tightness-looseness, the model had the form:

$$\begin{aligned}
& y_{ij} = \text{ReligiousAffiliationGrowth} = \beta_{0j} + \beta_{1j}(\text{OpennessToExperience}) + \\
& \beta_{2j}(\text{Conscientiousness}) + \beta_{3j}(\text{Extraversion}) + \beta_{4j}(\text{Agreeableness}) + \\
\text{Outcome Model : } & \beta_{5j}(\text{Neuroticism}) + \beta_{6j}(\text{CountryTightnessScore}) + \beta_{7j}(\text{ReligiousAffiliation}) + \\
& \beta_{8j}(\text{OpennessToExperience} \times \text{CountryTightnessScore}) + \\
& \beta_{9j}(\text{ReligiousAffiliation} \times \text{CountryTightnessScore}) + r_{ij} \\
& y_{ij} = \text{ReligiousAffiliation} = \beta_{0j} + \beta_{1j}(\text{OpennessToExperience}) + \\
\text{Mediation Model : } & \beta_{2j}(\text{Conscientiousness}) + \beta_{3j}(\text{Extraversion}) + \beta_{4j}(\text{Agreeableness}) + \\
& \beta_{5j}(\text{Neuroticism}) + \beta_{6j}(\text{CountryTightnessScore}) + \\
& \beta_{7j}(\text{OpennessToExperience} \times \text{CountryTightnessScore}) + r_{ij} \\
\text{Within-Country Intercept : } & \beta_{0j} = \gamma_{00} + u_{0j}
\end{aligned}$$

ReligiousAffiliation was a binary variable (religious affiliations = 1 vs. non-affiliations = 0). Therefore, mediation models with religious affiliations vs. non-affiliations as the dependent variable were a generalized linear mixed model with a binomial link function. In all statistical tests, the significance level was $p = 0.05$.

The R statistical packages “lme4” and “mediation” were used to conduct the moderated mediation analyses for the linear mixed models. Effect sizes in linear mixed models were the fixed effects’ marginal R^2 calculated following Nakagawa and Schielzeth’s (2013) recommendations using the R statistical package performance. All data analysis codes are available at https://osf.io/4muyt?view_only=48d9c23289c54827af02f7bed8c4e981 (accessed on 16 July 2023).

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