



# (Un)holy Smokes? Religion and Traditional and E-Cigarette Use in the United States

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## Abstract

This study employed national cross-sectional survey data from the 2021 *Crime, Health, and Politics Survey* ( $n=1578$  to 1735) to model traditional cigarette and e-cigarette use as a function of religious affiliation, general religiosity, biblical literalism, religious struggles, and the sense of divine control. Although the odds of abstaining from cigarettes and e-cigarettes were comparable for conservative Protestants and non-affiliates, conservative Protestants were more likely to cut down on cigarettes and e-cigarettes during the pandemic. Religiosity increased the odds of abstaining from cigarettes (not e-cigarettes) and reduced pandemic consumption of cigarettes and e-cigarettes. Biblical literalism was unrelated to abstaining from cigarettes and pandemic changes in cigarette use; however, biblical literalists were more likely to cut e-cigarette use during the pandemic. While the sense of divine control was unrelated to abstaining from cigarettes and e-cigarettes, these beliefs increased the odds of cessation from traditional and e-cigarette use. Finally, our religious struggles index was unrelated to smoking behavior. Our study is among the first to report any association between religion and lower e-cigarette use.

**Keywords** Religion · Religiosity · Smoking · Cigarettes · E-cigarettes

## Introduction

Over the past half century, numerous cross-sectional and longitudinal studies have shown that people who are more religious tend to exhibit healthier smoking beliefs and behaviors than their less religious counterparts (Benjamins & Buck, 2008; Clark et al., 1999; Degenhardt et al., 2007; Ford & Hill, 2012; Freeman, 2021; Garrusi & Nakhaee, 2012; Gillum, 2005a, 2005b, 2021; Gottlieb and Green, 1984; Gryczynski

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& Ward, 2011; Hill et al., 2006; Holt et al., 2015; Idler & Kasl, 1997; Karvinen & Carr, 2014; Kendler et al., 2003; Koenig et al., 1998; Koenig & Vaillant, 2009; Koenig et al., 2012; Mahoney et al., 2005; Nonnemaker et al., 2003, 2006; Parfrey, 1976; Strawbridge et al., 1997, 2001; Stylianou, 2004; Wallace & Forman, 1998; Wang et al., 2015; Ward et al., 2014; Whooley et al., 2002; Yong et al., 2009). Although previous research has emphasized the role of religious attendance, additional protective effects have been observed for religious identities (specific religious groups), private forms of religious behavior (prayer and scripture study), personal orientations and experiences with respect to religion and the divine (intrinsic religiousness, religious salience/importance, positive religious coping, divine relations, and spirituality), and various composite measures of general religiosity. Studies have also examined a wide range of smoking-related outcomes, including negative perceptions of smoking, lifetime smoking, current smoking, former smoking, regular and experimental smoking, smoking initiation, smoking cessation, quitting intentions, number of cigarettes, pack years, clinical nicotine dependence, and objective measures of cotinine (a tobacco alkaloid) in the blood. In perhaps the most comprehensive review of the religion and smoking literature, Koenig et al. (2012) reported that 88% of the 69 highest quality studies reported a protective role of religion. In another review, Garrusi and Nakhaee (2012: 270) concluded that “differences of focus and methodology notwithstanding, most studies have ascertained a deterrent role for religion as regards tobacco use.”

Although previous research has made significant contributions to our understanding of religious variations in smoking outcomes, the literature remains surprisingly underdeveloped in several respects. First, the unique contributions of religious affiliation, general religiosity, and specific religious beliefs have been generally understudied and undertheorized. In previous studies, religion measures are often treated as interchangeable with respect to their empirical associations and underlying theoretical explanations. In this context, it is uncommon to see any specific research questions, hypotheses, or theories for specific indicators of religion.

Second, little is known about specific religious beliefs, including beliefs concerning scripture (e.g., biblical literalism), God (e.g., the sense of divine control), and religious struggles (e.g., religious doubts). This knowledge gap is limiting because previous theorizing often centers around messages from religious texts and other religious teachings (Garrusi & Nakhaee, 2012; Idler & Kasl, 1997; Mahoney et al., 2005; Strawbridge et al., 2001). Over the past decade, control beliefs have become increasingly important to the broader study of religion and health (Hill et al., 2021a, 2021b; McCullough & Willoughby, 2009; Schieman et al., 2006). There is also mounting evidence of the mental and physical health risks associated with religious struggles (Ellison & Lee, 2010; Hill et al., 2021a, 2021b; Pargament et al., 2001; Upenieks, 2021).

Third, only a few studies have considered the association between religion and newer tobacco products like e-cigarettes (Balogh et al., 2018; Hoffmann, 2021; Owotomo & Maslowsky, 2017). This facet of tobacco consumption is important because e-cigarette use is on the rise and has now surpassed traditional cigarette use as the most commonly used tobacco product (Cornelius et al., 2020; Creamer et al., 2019). Although e-cigarettes are often perceived to be more socially acceptable

and less physically harmful than traditional cigarettes (Huang et al., 2019; Sæbø & Scheffels, 2017), e-cigarettes contribute to the re-normalization of smoking and to unique public health concerns (Cao et al., 2021; Glantz & Bareham, 2018; Lerner et al., 2015). Glantz and Bareham (2018, p. 215) explain that “while e-cigarettes deliver lower levels of carcinogens than do conventional cigarettes, they still expose users to high levels of ultrafine particles and other toxins that may substantially increase cardiovascular and non-cancer lung disease risks, which account for more than half of all smoking-caused deaths, at rates similar to conventional cigarettes.” Most recently, studies have linked e-cigarette use with an elevated risk of COVID-19 infection (Chen & Kyriakos, 2021; Gaiha et al., 2020; Merianos et al., 2022).

Finally, while recent studies of religion and health-related behavior and lifestyles have rightfully concentrated on infectious disease behaviors like mask use, social distancing, and vaccination (Gonzalez et al., 2021; Hill et al., 2020; Perry et al., 2020), researchers have seemingly shifted their focus from traditional chronic disease behaviors like smoking and drinking. This shift is noteworthy because the use of traditional cigarettes remains among the most devastating health behaviors with respect to morbidity and mortality, including the risk of death from COVID-19 (Lariscy et al., 2018; Patanavanich & Glantz, 2021). For these reasons, smoking behavior is considered a lynchpin mechanism of the apparent salutary effects of religious involvement on physical health and mortality (Clark et al., 1999; Gillum et al., 2008; Hill et al., 2017; Hummer et al., 1999; Idler et al., 2017; Koenig & Vaillant, 2009; Strawbridge et al., 1997, 2001).

In an effort to build on previous research, we employ national survey data that were collected during the COVID-19 pandemic to formally model the consumption of traditional cigarettes and e-cigarettes as a function of several indicators of religion, including religious affiliation, general religiosity, biblical literalism, religious struggles, and the sense of divine control. In the next section, we summarize relevant research to derive unique hypotheses for each dimension of religion. Because most of the literature is based on traditional cigarette smoking, we have extrapolated many of the ensuing arguments to e-cigarette use *a priori*. We revisit these assumptions in the discussion section.

## Background

### Religious Affiliation

Systematic evidence of religious affiliation differences in tobacco use is surprisingly limited. Nevertheless, a few patterns merit brief consideration. First, several studies over the years have reported that persons with no religious affiliation are more prone to smoking cigarettes and using other tobacco products than their counterparts who identify with a specific religious group (Cartwright, 2021, Hussain et al., 2019; Nunziata & Toffolutti, 2019). Second, members of religious groups with clear positions against tobacco use—especially sectarian groups such as the Jehovah’s Witnesses, Seventh-day Adventists, and Latter-day Saints—are especially unlikely to

smoke or consume other types of tobacco products (e.g., Jehovah's Witnesses, 2021; Koenig et al., 2012; Newport, 2013).

Beyond these basic patterns, the results are somewhat murky. According to some studies, Protestants (generally), evangelical Protestants (e.g., Baptists, Pentecostals), Black Protestants, and Orthodox Christians are less inclined to smoke than other persons (Cartwright, 2021; Degenhardt et al., 2007; Freeman, 2021; Wasserman & Trovato, 1996). However, other studies deviate from these findings. In their analysis of data collected from a large sample of US adults aged 20 to 32, Whooley et al. (2002) reported that Jews and Presbyterians were among the least likely to smoke, even when compared with evangelicals such as Baptists and Pentecostals. A subsequent national longitudinal study of adolescent smoking behavior showed no protective effects for Baptists, Pentecostals, Catholics, Lutherans, or Methodists (Nonnemaker et al., 2006). Another study of Latinos living in Texas reported that Protestants—nearly all of whom were affiliated with evangelical congregations—were especially unlikely to be current smokers when they attended services regularly, but not when they attended irregularly or not at all (Garcia et al., 2013).

Theoretically, religious affiliation should be fundamental to any effects of religion on smoking beliefs and behaviors. Different religious groups are initially socialized to exhibit unique patterns of religiosity, including different norms with respect to public religious activities (religious attendance and participation), private religious activities (prayer, meditation, and scriptural study), and religious salience (the degree to which adherents apply religion to different areas of life). These unique patterns of religiosity contribute to differences in exposure to religion-specific messages concerning sacred texts, the divine, and moral standards for living. Adherents may struggle more or less with the internalization of religious identities and beliefs and the development and maintenance of divine relations. Unique combinations of religiosity, religious beliefs, and struggles can eventually contribute to the ways in which adherents integrate their understanding of divine control into their lives as a framework for meaning-making (e.g., divine attributions of power) and coping (e.g., reliance on the divine for guidance and support). Each of these processes is discussed in greater detail in subsequent sections.

## Religiosity

In contrast to previous studies of religious affiliation, research consistently shows that people who are more religious—indicated by individual measures of religious attendance, prayer frequency, religious salience/importance, and by various composite measures of general religiosity—tend to exhibit healthier smoking beliefs and behaviors (Benjamins & Buck, 2008; Ford & Hill, 2012; Freeman, 2021; Garcia et al., 2013; Gillum, 2005a, 2005b, 2021; Gottlieb & Green, 1984; Gryczynski & Ward, 2011; Hill et al., 2006; Kendler et al., 2003; Koenig et al., 1998; Koenig et al., 2012; Marsiglia et al., 2012; Nonnemaker et al., 2003, 2006; Nunziata & Toffolutti, 2019; Strawbridge et al., 1997, 2001; Stylianou, 2004; Wallace & Forman, 1998; Wallace et al., 2003; Ward et al., 2014; Wasserman & Trovato, 1996; Whooley et al., 2002; Yong et al., 2009). These patterns are impressive in that they

have been observed in cross-sectional and longitudinal studies, at various stages of the life course (from adolescence to late life), among women and men, within different racial/ethnic groups (Latinos and non-Hispanic Blacks and Whites), around the world (Australia, Canada, Europe, Malaysia, Mexico, Thailand, and the USA), and across different smoking-related outcomes (negative perceptions of smoking, smoking incidence and prevalence, smoking initiation and cessation, number of cigarettes, pack years, nicotine dependence, and blood-level cotinine). One notable exception to these general patterns is religious media consumption (television and radio). In at least one study of older adults living in North Carolina, religious media consumption was associated with higher rates of current smoking and was unrelated to pack years in the full sample (Koenig et al., 1998). However, when this study's sample was limited to current smokers, religious media consumption was associated with fewer cigarettes smoked per day. Importantly, religiosity has been consistently unrelated to e-cigarette use in adolescence and young adulthood (Balogh et al., 2018; Hoffmann, 2021; Owotomo & Maslowsky, 2017).

Scholars have proposed several ideological, group-based, and psychosocial processes to explain why general religiosity is often associated with healthier smoking outcomes. Ideological explanations suggest that people who are more religious and more engaged with religious institutions have greater exposure to religious teachings that discourage smoking behavior and addiction (Garrusi & Nakhaee, 2012; Gottlieb & Green, 1984; Mahoney et al., 2005; Strawbridge et al., 2001; Whooley et al., 2002). For example, in the Bible, Corinthians (6:19–20) offers the following message: “Or do you not know that your body is a temple of the Holy Spirit within you, which you have from God, and that you are not your own? For you were bought with a price; therefore glorify God in your body.” Although processes related to the sanctification of the body may help to explain lower rates of alcohol consumption and illicit drug use, there is no support for this mechanism in the context of smoking (Mahoney et al., 2005). A related theory points to the internalization of negative attitudes and beliefs concerning the immorality and harmfulness of smoking (Ford & Hill, 2012; Gillum, 2005a; Koenig et al., 1998; Stylianou, 2004; Ward et al., 2014; Yong et al., 2009). In fact, there is direct evidence linking religiosity and lower rates of smoking behaviors through the internalization of anti-smoking sentiments (Ford & Hill, 2012; Ward et al., 2014).

Group-based explanations have proposed that people who are more religious and more engaged with religious institutions have greater exposure to non-smoking social networks. Non-smoking reference groups are thought to contribute to implicit norms against smoking behavior (Garrusi & Nakhaee, 2012). There are also more direct mechanisms of social control that are driven by structured time spent with peers and the explicit disapproval of smoking by religious leadership and social network members (Ford & Hill, 2012; Garrusi & Nakhaee, 2012; Gryczynski & Ward, 2011; Nunziata & Toffolutti, 2019; Strawbridge et al., 2001; Ward et al., 2014; Yong et al., 2009). Structured socializing (e.g., regular religious attendance) may limit smoking behavior by increasing exposure to authority figures and by reducing time spent in deviant social networks and routine activities (Garrusi & Nakhaee, 2012; Hoeben et al., 2016). Group-based processes are supported by evidence linking religiosity and healthier smoking behavior through the perceived anti-smoking

sentiments of family, peers, and religious leaders (Ford & Hill, 2012; Ward et al., 2014; Yong et al., 2009).

Finally, psychosocial explanations suggest that people who are more religious and more engaged with religious institutions are less motivated to smoke because they tend to have more social and psychological resources to manage stress and mental health (Ford & Hill, 2012; Garrusi & Nakhaee, 2012; Gillum, 2005a; Strawbridge et al., 2001; Whooley et al., 2002). The idea is that greater social support (from public religious involvement), the practice of religious coping (feeling supported by a divine other), a general sense of meaning, purpose, and coherence (from organized belief systems and roles in one's religious group and broader community), and better mental health help to limit the need for smoking as a form of self-medication. For example, Ford and Hill (2012) reported a significant indirect effect of religiosity on any tobacco use in the past year through depressive symptoms. In other words, religiosity contributed to lower rates of tobacco use by reducing depressive symptoms.

### Scripture Beliefs

Although religious doctrine (e.g., body as “temple of the Holy Spirit”) is often invoked to explain religious variations in smoking beliefs and behavior, researchers have yet to formally consider authoritative views of scripture, including widely used measures of biblical literalism or biblical inerrancy. As a basis for our analyses, we nevertheless summarize some indirect and inconsistent evidence from the study of alcohol and drug use in adolescence and young adulthood. In one study of marijuana persistence (used in all three waves), intermittence (used, stopped, used), and desistance (stopped using in one of the final waves) among adolescents and young adults (11–21 years), Ulmer et al. (2010) reported that respondents with stronger beliefs in scriptural inerrancy (The sacred scriptures of your religion are the word of God and are completely without any mistakes.) were less likely to engage in marijuana persistence (versus abstention) and *more* likely to engage in marijuana persistence (versus desistance). In this same analysis, scriptural inerrancy was unrelated to marijuana initiation (versus abstention), persistence (versus intermittence), abstention (versus desistance), and intermittence (versus desistance). In follow-up studies using these data, this research team showed that scriptural inerrancy was unrelated to marijuana initiation (versus abstention), any marijuana use, and any alcohol use (Desmond et al., 2013; Ulmer et al., 2012). Finally, Koch et al. (2021) recent analysis of college students at 12 universities (including three affiliated with conservative Christian denominations) showed that biblical inerrancy (e.g., The Bible is the infallible word of God.) was associated with lower rates of marijuana use, but not lower rates of alcohol consumption or use of other illicit drugs.

If religious doctrine truly helps to explain religious variations in smoking behavior, one would expect more consistent associations between scripture beliefs and substance use. However, available evidence suggests that biblical inerrancy is often unrelated to substance use in adolescence and young adulthood. To our knowledge, there are no previous studies of biblical literalism and smoking behavior in adulthood. While the empirical association between biblical literalism and smoking is

uncertain, the idea that the perceived authority of scripture could contribute to variations in smoking beliefs and behavior remains theoretically viable.

## Religious Struggles

Despite growing evidence of the health risks associated with religious struggles (e.g., religious doubts, strained relationships with God, and negative religious coping) (Ellison & Lee, 2010; Hill et al., 2021a, 2021b; Pargament et al., 2001; Upenieks, 2021), little is known about smoking-related outcomes. In fact, our review of the literature revealed only two relevant studies. In one analysis of adult twins from the population-based Virginia Twin Registry, Kendler et al. (2003) showed that stronger beliefs in a judgmental God (e.g., I believe God will punish me if I do something wrong.) were unrelated to nicotine dependence. In the second study, Horton and Loukas (2013) found that negative religious coping (e.g., I feel that stressful situations are God's way of punishing me for my sins or lack of spirituality.) was also unrelated to the quantity/frequency of cigarettes used in the past month.

Although there is no direct empirical evidence linking religious struggles with smoking behavior, the association remains theoretically plausible. Religious struggles refer to “tension and conflict about sacred matters within oneself, with others, and with the supernatural” (Stauner et al., 2016, p. 1). Such tensions and conflicts conceivably challenge the ideological, group-based, and psychosocial processes that would otherwise discourage smoking. Religious doubts could neutralize the moral authority of religious leadership and counter the internalization of religious teachings against smoking. Ideological struggles might also contribute to strained relationships with coreligionists, which could diminish the perceived social costs associated with violating group-based norms against smoking. Finally, the loss of ideological and group-based religious resources could undercut any psychosocial benefits of religious involvement through the loss of meaning and purpose (from ideological uncertainty), supportive social ties (from interpersonal conflicts), and emotional well-being (from the loss of psychosocial resources and the stress of ominous divine relations and beliefs).

## The Sense of Divine Control

The sense of divine control is the belief that “God exerts a commanding authority over the course and direction of one's life” (Schieman et al., 2006:529). People with a stronger sense of divine control believe that God has decided what their life shall be and depend on God for help and guidance. Although numerous studies have examined the effects of divine control—and related concepts that are both general (God control, involved God, God-mediated control, and locus of God control) and specific (God locus of health control, health God control, and spiritual health locus of control)—on various health-related outcomes (Alyami et al., 2020; Holt et al., 2003; Krause & Rainville, 2022; Krause et al., 2017; Upenieks & Schieman, 2021; Upenieks et al., 2022; Wallston et al., 1999; Welton et al., 1996), little is known

about smoking behavior. In fact, we could find only three relevant studies of smoking behavior (Holt et al., 2015; Karvinen & Carr, 2014; Kendler et al., 2003). The first study by Kendler et al. (2003) showed that stronger beliefs in an “involved God” (e.g., God responds to prayers and is very interested in our day-to-day lives) were associated with lower rates of nicotine dependence. Another study, based on a convenience sample of adults, reported no association between God locus of health control and current smoking behavior (Karvinen & Carr, 2014). Finally, Holt et al. (2015) were unable to find any direct or multiplicative effects of active (e.g., Even though I trust that God will take care of me, I still need to take care of myself.) or passive (There is no point in taking care of myself when it’s all up to God anyway.) spiritual health locus of control on regular smoking behavior in a national sample of Black adults.

Despite limited empirical evidence with respect to smoking, divine control remains theoretically viable in the sense that these kinds of beliefs may promote or discourage healthier lifestyles or be entirely inconsequential for health behavior. While some studies show that general measures of divine control are associated with healthier behaviors (e.g., lower levels of alcohol consumption) and generally healthy lifestyles (Krause & Rainville, 2022; Welton et al., 1996), others show less healthy behavior (e.g., less exercise) or no associations with specific health behaviors (e.g., diet and sleep quality) and general health lifestyles (Alyami et al., 2020; Krause et al., 2017). Research involving more specific measures of divine health control are similarly mixed, showing healthier behavior, riskier behavior, or no association with health behavior (Alyami et al., 2020; Holt et al., 2003, 2015; Karvinen & Carr, 2014). These inconsistencies could be explained by different styles of divine control beliefs (Holt et al., 2003, 2015; Wallson et al., 1999). People who are more passive in their divine control beliefs (e.g., When good or bad things happen, you see it as part of God’s plan for you.) place more responsibility for their lives and health with God. This orientation may be a form of theological fatalism. By contrast, people who are more active in their divine control beliefs (e.g., You decide what to do without relying on God.) assume more personal responsibility. People who are more collaborative (e.g., All things are possible when I work together with God.) share more responsibility with God. Although there is some evidence to suggest that more passive styles of divine control beliefs are associated with riskier health behavior, the data are far from uniform (Holt et al., 2003, 2015).

This body of research suggests a complicated relationship between religion and control beliefs. Although it is intuitive to expect people who are more religious to consistently cede responsibility and control to a higher power, religiosity is associated with greater perceptions of control, including higher levels of the sense of control or mastery, self-control, and health locus of control (Ellison & Burdette, 2012; McCullough & Willoughby, 2009; Pascoe et al., 2016; Schieman, 2008). In fact, the very concept of external attributional style is regularly challenged in the context of religion. Part of this observed pattern is explained by the more active and collaborative dimensions of divine control. Another part is explained by the popular integration of religion and 12-step programs for recovery from addiction (e.g., Alcoholics Anonymous and Narcotics Anonymous). In these contexts, addicts are encouraged to “admit that they are powerless over alcohol, that their lives have



become unmanageable” and to “turn their will and lives over to the care of God” (sometimes more generically described as a “Higher Power”) to facilitate a healthier lifestyle (Christo & Franeya, 1995).

## Hypotheses

Informed by the weight of the theoretical and empirical literature, we developed the following five hypotheses to guide our analyses. *Hypothesis 1*: Conservative Protestants will exhibit *higher* rates of smoking abstention and cessation than respondents with no religious affiliation. While this group-based difference has the most empirical support, we are much less confident in other group-based comparisons. *Hypothesis 2*: Respondents who score higher on religiosity will exhibit *higher* rates of smoking abstention and cessation than other respondents. This hypothesis is generated from the most consistent finding in the religion and smoking literature. *Hypothesis 3*: Biblical literalists will tend to exhibit *higher* rates of smoking abstention and cessation than other respondents. This hypothesis is based on the most commonly cited theory for the association between religion and smoking: Religious scripture is an ideological basis for variations in smoking beliefs and behaviors. *Hypothesis 4*: Respondents who score higher on religious struggles will tend to exhibit *lower* rates of smoking abstention and cessation than other respondents. Although empirical support for this hypothesis is limited, the theory concerning the various ways in which religious struggles undermine ties to religious institutions is strong. *Hypothesis 5*: Respondents who score higher on the sense of divine control will tend to exhibit *higher* rates of smoking abstention and cessation than other respondents. The empirical support for this hypothesis is mixed, but there is enough evidence with respect to smoking and other health-related behaviors to support this expectation.

## Data

To test our hypotheses, we use data from the 2021 *Crime, Health, and Politics Survey* (CHAPS). The primary purpose of CHAPS is to document the social causes and consequences of various indicators of health and well-being in the USA during the coronavirus (COVID-19) pandemic. CHAPS is based on a national probability sample of 1,771 non-institutionalized adults aged 18 and over living in the USA. Respondents were sampled from the National Opinion Research Center’s (NORC) AmeriSpeak© panel, which is representative of households from all 50 states and the District of Columbia (NORC, 2022). Sampled respondents were invited to complete the online survey in English between May 10, 2021 and June 1, 2021. The data collection process yielded a survey completion rate of 30.7% and a weighted cumulative response rate of 4.4%. The multistage probability sample resulted in a margin of error of  $\pm 3.23\%$  and an average design effect of 1.92. The median self-administered web-based survey lasted approximately 25 min. All respondents were offered the cash equivalent of \$8.00 for completing the survey, which is on the more

lucrative end of the incentive spectrum for a survey of this duration. The survey was reviewed and approved by the institutional review board at NORC and the review board of the lead author's university. Informed consent was obtained from all participants.

## Measures

### Smoking Abstinence and Cessation

We measure smoking abstinence and cessation with six outcome variables. Respondents were asked the following questions about their regular cigarette use: (a) "Are you a regular smoker of traditional cigarettes, a former smoker, or have you never smoked regularly?" (b) "Are you a regular user of e-cigarettes or smokeless cigarettes, a former user, or have you never used them regularly?" To measure smoking abstinence, these items were dummy coded to distinguish (1) respondents who have never smoked regularly and (0) respondents who identify as a regular or former smoker. Our analyses include three abstinence outcomes: from all cigarettes, from traditional cigarettes only, and from e-cigarettes only. Respondents were also asked the following questions about recent changes in their cigarette use: (c) "During the coronavirus (COVID-19) pandemic, would you say you have smoked traditional cigarettes more, less, or about the same as before the pandemic?" (d) "During the coronavirus (COVID-19) pandemic, would you say you have used e-cigarettes or smokeless cigarettes more, less, or about the same as before the pandemic?" To measure smoking cessation, these items were dummy coded to distinguish (1) respondents who reported less cigarette use during the pandemic and (0) respondents who reported no change in their behavior or more cigarette use during the pandemic. Our analyses include three cessation outcomes: from all cigarettes, from traditional cigarettes only, and from e-cigarettes only.

### Religious Affiliation

We measure religious affiliation with six dummy variables. These variables capture (a) conservative Protestants (those who reported being Protestant and evangelical/born again), (b) moderate Protestants (those who reported being Protestant without being evangelical/born again), (c) Catholics, (d) other Christians (e.g., those who reported being Mormon, Orthodox, or "just Christian"), (e) other religions (e.g., Jews, Buddhists, and Muslims), and (f) non-affiliates (those with no religious affiliation, including atheists and agnostics). In subsequent analyses, no religious affiliation serves as the common reference group.

## Religiosity

Religious involvement is measured as the mean response to four items. Respondents were asked two questions about their public religious activities: (a) “How often do you usually attend church, synagogue, or other religious meetings?” “How often do you usually attend church, synagogue, or other religious meetings remotely using a computer or phone?” Responses to these questions range from (1) never to (5) several times per week. Respondents were also asked about their private religious activities and the salience of religion in their lives: (c) “How often do you usually spend time in private religious activities such as prayer, meditation, or scriptural study?” (d) “How important is religion in your life today?” Responses to the private activities item range from (1) never to (7) more than once per day. Responses to the importance item range from (1) not important to (5) very important. All items are coded so that higher scores indicate greater religiosity. An exploratory principal components analysis with varimax rotation produced a single component (eigenvalue = 2.77), with loadings ranging from 0.79 to 0.86. A reliability analysis also suggested excellent internal consistency for three items ( $\alpha = 0.85$ ).

## Biblical Literalism

Biblical literalism is measured with the following item: “Which of these statements comes closest to describing your thoughts about the Bible?” Responses included (1) Bible is true in all ways and should be read literally, word for word. (2) Bible is true in all ways, but should not always be read literally. (3) Bible is mostly true about religious matters, but may contain errors about other things. (4) Bible is not the inspired word of God. This item was dummy coded to distinguish (1) Biblical literalists (response 1) and (0) other respondents (responses 2–4).

## Religious Struggles

Religious struggles are measured as the mean response to four items drawn from the *Religious and Spiritual Struggles Scale* (Exline et al., 2014). Respondents were asked to indicate how often they (a) “have doubts about their religious or spiritual beliefs,” (b) “feel judged or mistreated by religious or spiritual people,” (c) “feel as though God has abandoned them,” and (d) “feel as though God is punishing them.” Response categories for these items ranged from (1) never to (5) always so that higher index scores would indicate more religious struggles. An exploratory principal components analysis with varimax rotation produced a single component (eigenvalue = 2.28), with loadings ranging from 0.58 to 0.86. A reliability analysis also suggested adequate internal consistency for four items ( $\alpha = 0.74$ ).

## The Sense of Divine Control

The sense of divine control is measured as the mean response to three items drawn from previous research (Schieman et al., 2005). Respondents were asked the extent to which they agree or disagree with the following statements: (a) “God has decided what my life shall be.” (b) “I decide what to do without relying on God.” (c) “I depend on God for help and guidance.” Response categories for these items ranged from (1) strongly disagree to (5) strongly agree (with reverse coding for item b) so that higher index scores would indicate a greater sense of divine control. An exploratory principal components analysis with varimax rotation produced a single component (eigenvalue=2.38), with loadings ranging from 0.87 to 0.93. A reliability analysis also suggested excellent internal consistency for three items ( $\alpha=0.87$ ).

## Background Variables

Our multivariate analyses include several potential background correlates of our focal variables, including *age* (continuous years), *gender* (1=female; 0=male), *race/ethnicity* (dummy variables for Hispanic whites, non-Hispanic black, Latino, and other races/ethnicities), *nativity status* (1=US-born; 0=otherwise), *college degree* (1=four-year college degree or higher; 0=otherwise), *employment* (1=employed full- or part-time; 0=otherwise), *annual household income* (1=<\$10,000 to 9= $\geq$ \$150,000), *financial strain* (mean response to three items assessing the extent to which the respondent has trouble paying for health care, monthly bills, and food,  $\alpha=0.89$ ), *marital status* (1=married; 0=otherwise), *children* (1=presence of child under the age of 18; 0=otherwise), *urbanicity* (1=residence in a large city or town; 0=otherwise), and *region* (dummy variables for South, Northeast, Midwest, and West).

## Analysis

Depending on the outcome, our total possible sample size varied from 1755 and 1736 (regular use) to 1606 and 1588 (pandemic use). Due to listwise deletion of missing data, our analytic sample ranged from 1578 to 1735. In other words, over 90% of the total possible sample was retained across regression models.

Post-stratification weights were used to assess sampling error and non-response bias. NORC developed post-stratification weights for CHAPS via iterative proportional fitting or raking to general population parameters derived from the *Current Population Survey* (<https://www.census.gov/programs-surveys/cps/data.html>). These parameters included age, sex, race/ethnicity, education, and several interactions (age\*sex, age\*race, and sex\*race).

Table 1 presents descriptive statistics for all study variables, including variable ranges, sample means, and standard deviations. We then use binary logistic regression to model the odds of lifetime cigarette abstention (Table 2) and cigarette cessation during the pandemic (Table 3).

**Table 1** Weighted descriptive statistics

|   | Range          | Mean   | Standard deviation |
|---|----------------|--------|--------------------|
| Never Smoked Any Cigarettes             | 0 to 1         | 0.58   |                    |
| Never Smoked Trad. Cigarettes           | 0 to 1         | 0.59   |                    |
| Never Smoked E-Cigarettes               | 0 to 1         | 0.87   |                    |
| Smoked Trad. & E-Cigarettes <i>Less</i> | 0 to 1         | 0.15   |                    |
| Smoked Trad. Cigarettes <i>Less</i>     | 0 to 1         | 0.19   |                    |
| Smoked E-Cigarettes <i>Less</i>         | 0 to 1         | 0.20   |                    |
| Conservative Protestant                 | 0 to 1         | 0.21   |                    |
| Moderate Protestant                     | 0 to 1         | 0.11   |                    |
| Catholic                                | 0 to 1         | 0.19   |                    |
| Other Christian                         | 0 to 1         | 0.18   |                    |
| Other Religion                          | 0 to 1         | 0.05   |                    |
| No Religious Affiliation                | 0 to 1         | 0.26   |                    |
| Religiosity                             | - 1.06 to 1.84 | - 0.04 | 0.83               |
| Biblical Literalist                     | 0 to 1         | 0.20   |                    |
| Religious Struggles                     | 1 to 5         | 1.92   | 0.75               |
| The Sense of Divine Control             | 1 to 5         | 3.21   | 1.24               |
| Age                                     | 18 to 94       | 46.90  | 17.35              |
| Female                                  | 0 to 1         | 0.51   |                    |
| Non-Hispanic White                      | 0 to 1         | 0.63   |                    |
| Non-Hispanic Black                      | 0 to 1         | 0.11   |                    |
| Latino                                  | 0 to 1         | 0.16   |                    |
| Other Race/Ethnicity                    | 0 to 1         | 0.10   |                    |
| US-Born                                 | 0 to 1         | 0.90   |                    |
| College Degree                          | 0 to 1         | 0.36   |                    |
| Employed                                | 0 to 1         | 0.60   |                    |
| Household Income                        | 1 to 9         | 5.51   | 2.29               |
| Financial Strain                        | 1 to 5         | 1.73   | 0.94               |
| Married                                 | 0 to 1         | 0.51   |                    |
| Presence of Child                       | 0 to 1         | 0.17   |                    |
| Urban Residence                         | 0 to 1         | 0.29   |                    |
| Southern Resident                       | 0 to 1         | 0.37   |                    |
| Northeastern Resident                   | 0 to 1         | 0.17   |                    |
| Midwestern Resident                     | 0 to 1         | 0.21   |                    |
| Western Resident                        | 0 to 1         | 0.25   |                    |

$n = 1735$

We follow the same analytic strategy in each regression table. The coefficients for religious affiliation control for all background variables. The coefficients for religiosity, biblical literalism, religious struggles, and the sense of divine control adjust for religious affiliation (no other religion measures) and all background variables.

**Table 2** Weighted binary logistic regression of never having used cigarettes (abstention)

|                             | Abstention from traditional and E-Cigarettes | Abstention from traditional cigarettes | Abstention from E-Cigarettes |
|-----------------------------|--|--|------------------------------|
| Conservative Protestant     | 1.49<br>(0.97, 2.30)                         | 1.41<br>(0.91, 2.18)                   | 1.86<br>(0.92, 3.79)         |
| Moderate Protestant         | 1.09<br>(0.68, 1.76)                         | 1.12<br>(0.70, 1.80)                   | 1.42<br>(0.61, 3.28)         |
| Catholic                    | 1.16<br>(0.75, 1.77)                         | 1.11<br>(0.72, 1.70)                   | 1.42<br>(0.68, 2.96)         |
| Other Christian             | 1.08<br>(0.69, 1.68)                         | 1.11<br>(0.71, 1.74)                   | 0.96<br>(0.50, 1.83)         |
| Other Religion              | 0.77<br>(0.33, 1.76)                         | 0.88<br>(0.38, 2.07)                   | 0.69<br>(0.21, 2.23)         |
| Religiosity                 | 1.33**<br>(1.07, 1.66)                       | 1.29*<br>(1.04, 1.62)                  | 0.96<br>(0.69, 1.32)         |
| Biblical Literalist         | 1.17<br>(0.76, 1.81)                         | 1.29<br>(0.83, 2.01)                   | 1.62<br>(0.75, 3.53)         |
| Religious Struggles         | 1.00<br>(0.82, 1.24)                         | 1.00<br>(0.81, 1.24)                   | 0.85<br>(0.65, 1.13)         |
| The Sense of Divine Control | 0.95<br>(0.81, 1.12)                         | 0.95<br>(0.80, 1.12)                   | 0.86<br>(0.66, 1.12)         |

Shown are unstandardized odds ratios, 95% confidence intervals in parentheses, and two-tailed significance tests:  $p < 0.05^*$ ;  $p < 0.01^{**}$ ;  $p < 0.001^{***}$ . Reference categories include no religious affiliation

The estimates for religious affiliation control for age, gender, race/ethnicity, nativity status, education, employment, household income, financial strain, marital status, presence of children, urbanicity, and region

The estimates for religiosity, biblical literalism, religious struggles, and the sense of divine control adjust for religious affiliation (no other religion measures) and all background variables

$n = 1735$

All regression models present odds ratios, 95% confidence intervals, and two-tailed statistical tests.

## Results

### Descriptive Analyses

According to Table 1, the majority of respondents reported never having regularly smoked any cigarettes (58%), traditional cigarettes (59%), and e-cigarettes (87%). Respondents reported smoking both traditional and e-cigarettes (15%), traditional cigarettes (19%), and e-cigarettes (20%) less often during the pandemic. In terms of religious affiliation, the sample included conservative Protestants (21%), moderate Protestants (11%), Catholics (19%), other Christians (18%), respondents of other religious faiths (5%), and respondents with no religious affiliation (26%). The

**Table 3** Weighted binary logistic regression of having smoked fewer cigarettes during the pandemic (cessation)

|                             | Cessation from traditional and E-Cigarettes | Cessation from traditional Cigarettes | Cessation from E-Cigarettes |
|-----------------------------|---|---------------------------------------|-----------------------------|
| Conservative Protestant     | 3.19**<br>(1.65, 6.20)                      | 1.99*<br>(1.13, 3.49)                 | 2.93***<br>(1.70, 5.03)     |
| Moderate Protestant         | 1.50<br>(0.70, 3.12)                        | 1.26<br>(0.68, 2.34)                  | 1.46<br>(0.77, 2.77)        |
| Catholic                    | 2.74**<br>(1.43, 5.23)                      | 1.76*<br>(1.02, 3.03)                 | 2.24**<br>(1.29, 3.90)      |
| Other Christian             | 2.35*<br>(1.09, 5.10)                       | 1.57<br>(0.83, 2.96)                  | 1.91*<br>(1.01, 3.63)       |
| Other Religion              | 2.82*<br>(1.02, 7.80)                       | 2.68*<br>(1.10, 6.50)                 | 2.91*<br>(1.16, 7.29)       |
| Religiosity                 | 1.57**<br>(1.19, 2.06)                      | 1.57***<br>(1.22, 2.02)               | 1.45**<br>(1.12, 1.87)      |
| Biblical Literalist         | 1.59<br>(0.96, 2.66)                        | 1.47<br>(0.91, 2.37)                  | 2.40***<br>(1.49, 3.87)     |
| Religious Struggles         | 0.97<br>(0.68, 1.38)                        | 0.88<br>(0.65, 1.19)                  | 1.08<br>(0.80, 1.46)        |
| The Sense of Divine Control | 1.25*<br>(1.01, 1.54)                       | 1.25*<br>(1.02, 1.53)                 | 1.27*<br>(1.04, 1.55)       |

Shown are unstandardized odds ratios, 95% confidence intervals in parentheses, and two-tailed significance tests:  $p < 0.05^*$ ;  $p < 0.01^{**}$ ;  $p < 0.001^{***}$ . Reference categories include no religious affiliation

The estimates for religious affiliation control for age, gender, race/ethnicity, nativity status, education, employment, household income, financial strain, marital status, presence of children, urbanicity, and region

The estimates for religiosity, biblical literalism, religious struggles, and the sense of divine control adjust for religious affiliation (no other religion measures) and all background variables

$n = 1578$

average respondent reported low levels of religiosity and religious struggles and moderate levels of the sense of divine control. Few respondents were classified as biblical literalists (20%).

### Smoking Abstinence

In Table 2, we model the odds of never having regularly smoked cigarettes (abstaining). Across outcomes, we failed to observe any differences by religious affiliation, biblical literalism, religious struggles, or the sense of divine control. In other words, the odds of never having smoked regularly were comparable for (a) respondents who identify with a religious group and those who do not, (b) those who believe that the Bible is true in all ways, (c) those who struggle more or less with their religious beliefs and divine relations, and (d) those who believe more or less that God directs and supports their life. Although each unit increase in religiosity raises the

odds of abstaining from traditional cigarettes *and* e-cigarettes (combined) by 33% ([1.33-1] 100) and traditional cigarettes (separately) by 29%, religiosity is unrelated to abstaining from e-cigarette use (separately).

### **Pandemic Smoking Cessation**

In Table 3, we model the odds of having smoked fewer cigarettes during the pandemic (cessation). Across outcomes, we find several differences by religious affiliation. Compared to respondents with no religious affiliation, conservative Protestants exhibit a 219% increase in the odds of smoking fewer traditional cigarettes and e-cigarettes (combined), a 99% increase in the odds of smoking fewer traditional cigarettes (separately), and a 1.93% increase in the odds of smoking fewer e-cigarettes (separately). We observe substantively identical patterns across outcomes for Catholics and respondents of “other religions.” The odds of smoking fewer traditional cigarettes and e-cigarettes (combined) and e-cigarettes (separately) were higher for “other Christians” than for respondents with no religious affiliation. We failed to observe any differences between moderate Protestants and non-affiliates across outcomes. Religiosity and the sense of divine control are consistently associated with smoking cessation across outcomes. Each unit increase in religiosity raises the odds of smoking fewer traditional cigarettes and e-cigarettes (combined) by 57%, the odds of smoking fewer traditional cigarettes (separately) by 57%, and the odds of smoking fewer e-cigarettes (separately) by 45%. Each unit increase in the sense of divine control raises the odds of smoking fewer traditional cigarettes and e-cigarettes (combined) by 25%, the odds of smoking fewer traditional cigarettes (separately) by 25%, and the odds of smoking fewer e-cigarettes (separately) by 27%. Although biblical literalism is unrelated to cessation from traditional cigarettes and e-cigarettes (combined) and traditional cigarettes (separately), the odds of smoking fewer e-cigarettes (separately) are 140% greater for biblical literalists than for respondents with other views about the Bible. Finally, we failed to observe any differences by religious struggles across outcomes.

### **Discussion**

Although previous research has made significant contributions to our understanding of religious variations in smoking beliefs and behaviors, unique religion measures have been undertheorized, important religion concepts and new smoking behaviors have been understudied, and important chronic disease behaviors like smoking have been undervalued, particularly during the COVID-19 pandemic. Building on previous work, we employed recently collected national survey data to formally model the consumption of traditional cigarettes and e-cigarettes as a function of several indicators of religion, including religious affiliation, general religiosity, biblical literalism, religious struggles, and the sense of divine control.

Our first hypothesis, that conservative Protestants would tend to exhibit higher rates of smoking abstention and cessation than respondents with no religious



affiliation, received mixed support. On the one hand, the odds of abstaining from traditional cigarettes and e-cigarettes were comparable for conservative Protestants and respondents with no religious affiliation. Although these findings are inconsistent with some studies (Freeman, 2021; Garcia et al., 2013; Wasserman & Trovato, 1996), they are not without precedent (Degenhardt et al., 2007; Nonnemaker et al., 2006). On the other hand, conservative Protestants (and Catholics) were more likely than non-affiliates to have cut their consumption of traditional cigarettes and e-cigarettes during the pandemic. Our study is the first of which we are aware to document an association between religious affiliation and e-cigarette use.

Our second hypothesis was that respondents who score higher on religiosity would tend to exhibit higher rates of smoking abstention and cessation than other respondents. This result was our most consistent finding. Religiosity increased the odds abstaining from traditional cigarettes and increased the odds of cessation from traditional cigarettes and e-cigarettes during the pandemic. Although our findings for traditional cigarette use support numerous studies (see Garrusi & Nakhae, 2012; Koenig et al., 2012 for reviews), we are the first to document an association between religiosity and e-cigarette use. We were unable to observe any association between religiosity and abstaining from e-cigarettes, which is also consistent with previous research (Balogh et al., 2018; Hoffmann, 2021; Owotomo & Maslowsky, 2017).

Our third hypothesis was that biblical literalists would tend to exhibit higher rates of smoking abstention and cessation than other respondents. We found little support for this hypothesis. Biblical literalism was unrelated to abstaining from traditional cigarettes and e-cigarettes and pandemic changes in traditional cigarette use. These results are generally consistent with previous studies showing no association between scriptural inerrancy and the use of marijuana and alcohol in adolescence and young adulthood (Desmond et al., 2013; Ulmer et al., 2012). We found some evidence to suggest that biblical literalists were more likely to have cut e-cigarette use during the pandemic. This pattern is consistent with previous studies of scriptural inerrancy and marijuana use (Koch et al. 2021; Ulmer et al., 2010).

Our fourth hypothesis stated that respondents who score higher on religious struggles would tend to exhibit lower rates of smoking abstention and cessation than other respondents. We found no support for this hypothesis in our main analyses. In fact, our religious struggles index was unrelated to all four of our smoking outcomes. These null patterns confirm previous work with data collected from a national sample of adults and multiple smoking outcomes (Horton & Loukas, 2013; Kendler et al., 2003). We note that our supplemental analyses indicated that two indicators of religious struggles (feeling abandoned by God and judged or mistreated by religious or spiritual people) reduced the odds of abstaining from e-cigarettes. These patterns, which are unprecedented in the literature, are consistent with our fourth hypothesis.

Our fifth and final hypothesis suggested that respondents who score higher on the sense of divine control would tend to exhibit higher rates of smoking abstention and cessation than other respondents. Again, we found mixed support for this hypothesis. While the sense of divine control was unrelated to abstaining from traditional and e-cigarettes (combined and separately), these beliefs increased the odds of cessation from traditional and e-cigarettes (combined and separately). The null patterns for the sense of divine control support some previous studies (Holt et al., 2015;

Karvinen & Carr, 2014). However, the finding that divine control could increase the odds of cessation is more consistent with previous studies linking divine control beliefs with healthier behaviors like lower levels of nicotine dependence and alcohol consumption (Holt et al., 2015; Kendler et al., 2003; Krause & Rainville, 2022; Welton et al., 1996). The inconsistencies in our findings could be due to the fact that our measure of divine control is weighted more toward the distribution of power (possibly leading to personal quiescence or fatalism) than toward a perceived collaboration with God.

While previous studies tend to focus on one or two seemingly interchangeable religion measures and traditional cigarette use, we contribute to previous work by examining the unique effects of religious affiliation, religiosity, biblical literalism, religious struggles, and the sense of divine control on traditional cigarette use, e-cigarette use, and pandemic smoking behavior. Although religion was unrelated to lifetime abstention from e-cigarettes, several indicators of religion (religious affiliation, religiosity, biblical literalism, and the sense of divine control) increased the odds of cessation from e-cigarettes during the pandemic. It is likely that few institutions of religion have directly addressed the morality of e-cigarette use. This makes sense because e-cigarettes have only recently emerged in the USA over the last two decades. Prior to the FDA's "deeming rule" in 2016, many e-cigarettes were marketed as cessation devices. While many people perceive e-cigarettes to be safer than cigarettes, the messaging around the health effects of traditional cigarettes have been unambivalent and in place for a generation. These differences in norms and perceptions of safety and acceptability of traditional cigarettes versus e-cigarettes may contribute to the null associations with lifetime abstention. We note that similar patterns have been observed for other "morally ambiguous" outcomes like prescription drugs and medical marijuana (Burdette et al. 2018a, 2018b).

This combination of results suggests a recent activation of the deterrent role of religion with respect to e-cigarette use during the pandemic (i.e., no effects for lifetime abstention, but consistent effects for pandemic cessation). While this finding is difficult to interpret, two potential explanations deserve consideration. First, it is possible that religious networks are particularly well suited to transmitting relatively new information about the potential harms of somewhat novel substances such as e-cigarettes. A good deal of research has focused on the transposability (transference, portability) of religious schemas (e.g., Shah et al., 2016). It is possible that religious schemas (durable interpretive frameworks) that have long conveyed opposition to traditional cigarette use are readily parlayed into concerns and cautions about e-cigarettes among people of faith. Second, it is quite likely that some religious groups and people understood the pandemic as a possible "end times" cataclysm or at least a morally significant event (even, for some, a sign from God). Their religious viewpoint may have prompted them to engage in health behavior changes that amounted to "cleaning up" their body-as-temple, at least where e-cigarettes were concerned. Clearly, additional research is needed to determine if this pattern is observed concerning other substances. And the use of other methods (e.g., qualitative inquiry) is needed to explore these possibilities in greater detail.

In our analyses, religiosity stands out as the only consistent predictor of smoking behavior. This finding is notable because the individual items in the religiosity index are inconsistently associated with smoking behavior. While some items are unrelated to smoking (e.g., religious importance), others are positively associated with smoking (e.g., prayer). Prayer may be a reactive response, even a petition for help, to intended cessation that is difficult to implement and sustain. In the end, physical attendance (not virtual attendance) and the synergistic effects of the combined religiosity index are the most reliable predictors of smoking abstinence and cessation. In contrast to general religiosity, the protective effects of religious affiliation and biblical literalism were more sporadic. Given that the protective effects of religious affiliation were entirely explained by more robust levels of general religiosity (not shown), there were no residual ideological effects net of adjustments for public and private religious activities. The effects of religious struggles and the sense of divine control also range from non-existent to insalubrious. These patterns, along with the more pronounced pandemic effects, lead us to prioritize group-based and psychosocial processes over more enduring and stable religion-specific ideological mechanisms when explaining variations in smoking behavior.

## Study Limitations

We note that our analyses are limited by our cross-sectional design and self-reported data. Although we have emphasized theoretical explanations that imply a true causal association between religiosity and smoking-related behavior, our analyses are vulnerable to two alternative or artifactual explanations. The first alternative explanation suggests that the apparent protective effects of religious involvement on smoking are due to social desirability (Gillum, 2005a). In other words, people who are more religious and more engaged with religious institutions may be motivated to lie about their smoking beliefs and behaviors to present a consistent religious identity. This possibility has been addressed and dismissed by studies linking religiosity (religious attendance) with lower levels of cotinine in the blood (Gillum, 2005a, 2005b, 2021). The logic is that nicotine biomarkers are not subject to the same social desirability processes that threaten self-reports of smoking. If religious people were systematically underreporting their smoking behavior, religiosity would be unrelated to more objective assessments of smoking behavior. These data are also relevant to group-based explanations. The level of cotinine in the blood is a general indicator of exposure to tobacco smoke from all sources, including second-hand environmental exposures. This research is consistent with the notions of more religious people being more socially integrated into non-smoking social networks and more personally motivated and equipped to avoid smoking.

The second alternative explanation suggests that the apparent protective effects of religious involvement on smoking are due to health behavior selection (Whooley et al., 2002). In other words, people who engage in behaviors that are normative to a group are more likely to become members or remain as members of the group. Alternatively, if people engage in behaviors that are non-normative

or stigmatized by the group, they may be socially disqualified or rejected from the group. This concern is addressed by research showing an inverse association between religiosity and smoking when controlling for prior smoking status and when the sample is limited to smokers (Koenig et al., 1998). In these designs, the protective effects of public and private forms of religiosity are observed when smoker status is adjusted or held constant. Of course, this second alternative is also lent force by considerations of religion and health as “structuring structures,” a concept first popularized by Bourdieu (1990). From this vantage point, lifestyle practices in the social fields of religion and health may be linked through mutual reinforcement with complementary logics (wellness advocacy in the health field, bodily sanctification in the religious field). This perspective can help researchers to delve more deeply into what are sometimes called (or criticized as) “selection effects.” Yet, these observed forms of “selectivity” are, in fact, a product of living in complex, cascading social worlds that sometimes overlap and thereby foster attitudinal or behavioral reinforcement. More theoretically grounded research with rich data is needed to explore this process in greater detail.

## Conclusion

Although we are confident that religiosity and, to a lesser extent, religious affiliation and biblical literalism can play a deterrent role with respect to smoking behavior, additional research is needed to replicate our findings with longitudinal data, more objective measures of smoking, and more active and collaborative assessments of divine control (e.g., active spiritual health locus of control and God-mediated control). In this study, we emphasized the combined effects of general religiosity, but future research will need to unpack the unique role of prayer, including different types of prayer. Additional studies assessing mediation are needed to establish any ideological, group-based, or psychosocial mechanisms of religious variations in smoking behavior. Finally, we must also take stock of the moderating role of religion. For example, the sense of divine control could moderate or buffer the effects of known risk factors for smoking (e.g., pandemic stress). These are just a few directions to improve our understanding of religion and smoking behavior. Finally, while we have no clinical expertise as social scientists, there may be some practical benefits associated with providing an option for the delivery of tobacco cessation services in cooperation with faith-based organizations for clients who prefer the integration of spiritual or religious elements into such interventions. Of course, any such partnerships should proceed with great caution to ensure that client choice in program content is fully respected, and we leave the implementation of such ventures to those with greater expertise in the health promotion field.

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## Declarations

**Conflict of interest** All authors declare no conflict of interest.

**Informed consent** Because this article employed secondary data that were previously collected de-identified data to protect respondents, it was exempt from human subjects review. When the study was collected, informed consent was obtained from all individual participants. No animals were included in the study.

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