Conservative Christianity, Partnership, Hormones and Sex in Late Life.

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ABSTRACT

Using nationally representative data from the 2005-2006 U.S. National Social Life, Health, and Aging Project (NSHAP), this study queried relationship, sexual, and sex hormone patterns among married evangelical women and men aged 57 to 85, relative to those in other religions. Results suggested that despite potentially more unequal gender roles, evangelical older women may have better marital quality—perhaps due to the recent transformation of their male counterparts into authoritative-yet-supportive "soft patriarchs". Correspondingly, these women—especially those with greater subjective religiosity, or more support from a spouse—reported consistently better sexual outcomes than their counterparts in other religions. In addition, they also had lower estradiol—whether due to psychobiological effects of their better relationships, or self-selection of those with differential hormone levels into particular partnership patterns. While older men in these communities also experienced more satisfactory marriages, and had lower androgens (testosterone, DHEA), their relational assets were less uniformly matched by better sexual outcomes—perhaps reflecting a gender disparity in the linkage between these factors.

KEY WORDS: evangelicals; older adults; marital quality; sexual outcomes; sex hormones; NSHAP.

INTRODUCTION

Recent studies suggest that despite patriarchal gender roles, marital quality may be higher among conservative Christians (evangelicals) than other religious groups—partly due to more supportive behavior from one's spouse (Bartowski, 2001; Wilcox, 2004, 2006; Wilcox & Nock, 2006; Wilcox & Wolfinger, 2007, 2008; Wolfinger & Wilcox, 2008). This is particularly true among women, whose happiness in the marriage seems more strongly affected than men's by a partner's support and emotional availability (England & Farkas, 1986; Erickson, 1993; Maccoby, 1998; Nock, 2001; Sayer & Bianchi, 2000; Thompson & Walker, 1989; Wilkie, Ferree, & Ratcliff, 1998). A separate literature links relationship satisfaction to greater sexual desire, activity, and pleasure—with this association again potentially stronger among women than men (Avis et al., 2005; Basson, 2008; Dennerstein, Dudley, & Burger, 2001; Dunn, Croft, & Hackett, 1999; Meston & Buss, 2007). This may be especially true at older ages, when intimacy and trust can help in the maintenance of satisfactory sex in the presence of age-related frailties (Das, Laumann, & Waite, 2012). Finally, recent biomedical studies indicate associations of these partnership patterns with sex-hormone levels—suggesting unexplored differentials in the latter across religious groups.

Despite these potential linkages, there have been few empirical and no nationally representative analyses of relationship and especially sexual outcomes among evangelical older adults. Using data from the 2005-2006 National Social Life, Health, and Aging Project (NSHAP)—a national probability sample of U.S. adults aged 57 to 85—the present study begins to fill these gaps. In addition to providing baseline data on a range of sexual, hormonal, and partnership differentials among married evangelical women and men in late life, relative to those

in other religions, it examined variations in these patterns by subjective religiosity, and by a partner's support.

Christian Conservatism and Marital Quality

Two divergent perspectives emerge from the literature on Christian conservatism and marital quality: a *feminist theory* approach assuming patriarchal gender roles among evangelicals, and hence these women's lower satisfaction in the relationship; and a *neotraditional* approach predicting their greater marital happiness due to evangelical men's decades-long and church-promoted transformation into emotional available and supportive "soft patriarchs" (Wilcox, 2004, p. 53).

Some scholars rooted in feminist theory have tended to assume that greater patriarchy among conservative Christians lowers their marital quality, particularly among women (Gallagher, 2003; McQuillan & Ferree, 1998; Wilcox, 2006). Consistent with this view, multiple studies indicate a strong association between "traditional" gender roles in the household, and more marital conflict as well as women's greater relationship unhappiness (Blair & Johnson, 1992; Greenstein, 1996; Hochschild & Machung, 1989). Moreover, a substantial literature does suggest gender inequality in evangelical marriages—as reflected in the Southern Baptist Convention's 1998 declaration that a wife should "submit herself graciously" to her husband's leadership (Niebuhr, 1998; Wilcox, 2006, p. 42). Empirical studies find particularly strong support for traditional gender attitudes and inequality in household duties among conservative Christian communities, and a strikingly high likelihood of these women to marry and bear children early, and remain permanently outside the workforce (Bartkowski, 1999, 2001; Bartkowski, Wilcox, & Ellison, 2000; Glass & Jacobs, 2005; Wilcox, 1998, 2006). Moreover, these values and behaviors seem directly fostered by church-based activities and connections—

with evangelical institutions providing strong social, ideological, and political support for conservative gender and family policies (Wilcox, 2006).

Despite these patterns, a cluster of recent studies—both qualitative and probability-sample—suggests *better* marital quality among conservative Christians than other religious groups, particularly for women (Wilcox, 2004, 2006; Wilcox & Wolfinger, 2007, 2008; Wolfinger & Wilcox, 2008). In part, the mechanism seems to be more supportive behavior and emotional availability by evangelical men—an especially crucial factor for women's greater satisfaction in the relationship (England & Farkas, 1986; Erickson, 1993; Maccoby, 1998; Nock, 2001; Sayer & Bianchi, 2000; Thompson & Walker, 1989; Wilkie et al., 1998). In turn, these behaviors seem driven by a decades-long process of ideological and social change within evangelical religious institutions (Hunter, 1987; Miller, 1997; Roof, 1993; Shibley, 1996; Wilcox, 1998). As Wilcox (2006) argues, concern over the degeneration of marriage and the family—coupled with feminism raising women's expectations of men even within conservative communities—have led these churches to focus specifically on improving men's family patterns. Analysis of texts and self-help manuals promoted by evangelical groups, such as the Promise Keepers, indicates that men are perceived as the "weak link" in families, and their emotional unavailability and irresponsible behaviors as one reason behind divorces, frail families and (more generally) a disintegration of America's traditional social fabric (Hegstrom, 2004; McCartney, Trent, & Smalley, 1992; Spalding, 1996; Wilcox 2004, 2006). Accordingly, through sermons, church-based activities, and mass media, evangelical institutions have expended much effort in encouraging men to prioritize their marriages, and give time and attention to their wives and children (Bartkowski, 2001; Blanchard, Goyer, & Hodges, 2013; Hunter, 1987; Keller, 2011; McCartney et al., 1992; Pinckney, 1997; Wilcox, 1998, 2006; Yerkovich & Yerkovich, 2008).

The focus seems especially to be on promoting men's emotional openness and expressiveness, as a means to nurturing deep and meaningful worldly connections mirroring the relationship between Christ and the church (Hunter, 1987; Keller, 2011; Pinckney, 1997; Smalley & Smalley, 2010; Wilcox & Wolfinger, 2007; Wolfinger & Wilcox, 2008; Yerkovich & Yerkovich, 2008). Correspondingly, demographic studies suggest that churchgoing evangelical husbands are more involved and affectionate in their marriages than those with other religious affiliations, and their wives report more happiness in the relationship (Wilcox & Wolfinger, 2007; Wolfinger & Wilcox, 2008). Overall, this emerging literature indicates that these marriages may blend traditional and unequal gender roles with unusually high levels of emotional intimacy as well as support from the male partner—a relational style that has been termed "neotraditional" (Wilcox, 2006, p. 44). In addition, evangelical institutions and church-centered networks seem to strongly emphasize "decency" in social roles—i.e., hard work, marital fidelity, avoidance of risky behaviors such as drinking and drug abuse, and responsible parenting (Wilcox, 2006; Wilcox & Wolfinger, 2008). Thus, these communities may have more stable life- and family-patterns, experiencing lower rates of divorce and of domestic violence than any other major religious group (Ellison, Bartkowski, & Anderson, 1999; Wilcox, 2006). These conjectures led to Hypothesis 1 (Table 1).

Next, biomedical literature indicates that these religious-group variations in partnership may also correspond with distinct (and unexplored) sex-hormone differentials. Among women, for instance, a small set of convenience-sample studies indicates that lower estradiol may be linked to fewer lifetime sex partners and more satisfaction in a current relationship (Durante & Li, 2009). It remains unclear whether less estradiol leads women to select into these relationship patterns—or whether psychobiological effects of current or past partnerships induce these

hormone levels. However, potential explanations include these women's weaker receptivity to mating signals, lower self- and other-rated attractiveness, and hence a diminished propensity toward "opportunistic mating" or search for higher-quality mates (Buss & Shackelford, 2008; Durante & Li, 2009; Roney & Simmons, 2008; Roney, Simmons, & Gray, 2011; Schmitt & Buss, 2001). Similarly, associations have been reported for both genders, and especially men, between lower androgen levels and fewer current or lifetime partners (Alvergne, Faurie, & Raymond, 2009; Archer, 2006; Bogaert & Fisher, 1995; Gray, 2003; Peters, Simmons, & Rhodes, 2008; Pollet, van der Meij, Cobey, & Buunk, 2011; van Anders, Hamilton, & Watson, 2007)—with this diminished serial- or concurrent-polyamory arguably enhancing marital commitment and quality. Among men, for instance, a large literature on the "challenge hypothesis" indicates that both testosterone and DHEA may catalyse a trade-off between mating and parenting effort—such that lower levels of these androgens may inhibit sexual promiscuity and promote investments in one's monogamous partner (Archer, 2006; Wingfield, Hegner, Dufty, & Ball, 1990). As with women's estradiol, however, pathways are yet to be established. In contrast to the challenge hypothesis, a rival "social modulation" model suggests an effect of relationship patterns to hormones, such that long-term "exposure" to a stable and high-quality partnership might lower one's androgens (Archer, 2006; Pollet et al., 2011). Regardless of causal direction, the evidence above suggests that if marital quality is indeed higher among evangelicals, these men and women may also exhibit lower sex-hormone levels. Accordingly, Hypothesis 2 (Table 1) was included to examine hormonal differentials by religious category.

To summarize, the positive behavioral impact of constant church-promoted ideological and social pressures may make evangelical men more emotionally expressive as well as reliable spouses, potentially leading to happier and more committed marriages—variations that should be

especially consistent among those most religious in this group. Moreover, these partnership patterns may also correspond with unexplored differentials in sex-hormone levels. In turn, a growing literature supports a strong association between these relationship traits, and sexual behaviors and satisfaction, along with gender differences in these connections.

Relationship Quality and Sex

As noted, a range of studies links happiness in the partnership to better sexual outcomes—especially among women. Recent theoretical frameworks of the sexual response cycle consistently indicate a role of emotional intimacy in women's greater desire for and satisfaction in sex. Thus, for instance, Basson's "circular model" posits women's subjective desire, as well as arousal, as responsive rather than spontaneous or innate—with such responsivity induced in large part by psychosocial aspects of the relationship (Basson, 2001, 2005, 2008; Basson et al., 2004; Giles & McCabe, 2009; Leiblum, 2001; McCabe et al., 2010). Similarly, the "dual control" model proposed by Bancroft and colleagues (Bancroft et al., 2005; Bancroft, Graham, Janssen, & Sanders, 2009; Bancroft & Janssen, 2000) suggests a role of negative relationship features in inhibiting both women's and men's sexual response. Empirically, multiple studies indicate that partnership problems are a major self-perceived cause of women's dysunctions (King, Holt, & Nazareth, 2007)—and associated with multiple sexual problems among older men as well as women (Das et al., 2012; Laumann, Das, & Waite, 2008). In contrast, positive feelings toward a current partner (generally, as well as during intercourse) seem to avert sexual distress (Bancroft, Loftus, & Long, 2003), and among older women, may alleviate dysfunction due to hormone loss (Dennerstein et al., 2001). More broadly, there is growing evidence from cross-sectional as well as longitudinal studies that factors such as emotional bonding, romance, and happiness in the relationship are key triggers for sexual desire,

responsivity, as well as satisfaction among both men and women at all ages (Avis et al., 2005; Basson, 2008; Dennerstein et al., 2001; Dunn et al., 1999; Meston & Buss, 2007). This can be particularly true in late life, when maintenance of satisfactory sex despite increasing frailty, health problems, and dysfunctions—one's own or a partner's—may require more mutual understanding and trust (Das et al., 2012). If so, older adults with higher marital quality—such as, potentially, evangelical men and especially women—may also experience better sexual outcomes than those in other religious groups. Hypothesis 3 (Table 1) reflects these arguments.

METHOD

Participants

Data were from the 2005-2006 U.S. National Social Life, Health, and Aging Project. NSHAP is a nationally-representative probability sample of 1550 women and 1455 men aged 57 to 85 years, with an oversampling of Blacks, Hispanics, men, and those 75 to 85. The mean age for both women and for men was 68 years. In-home interviews of household-dwelling adults in these age ranges were conducted between July 2005 and March 2006, in both English and Spanish. The survey had an unweighted response rate of 74.8% and a weighted response rate of 75.5% (Lindau et al., 2007; O'Muircheartaigh, Eckman, & Smith, 2009).

Procedure

In addition to self report, data included assessments of physical and sensory function, height and weight, and salivary, blood, and vaginal mucosal samples—all collected at the time of interview by non-medically trained interviewers. Most interviewers were experienced personnel given further training in conducting interviews by NORC at the University of Chicago, and remained with the project throughout the interview period. Participant consent was obtained

prior to interview. Institutional review boards at the Divison of the Social Sciences and NORC at the University of Chicago approved data collection procedures (Smith et al., 2009).

Measures

Dependent variables

First, partner support was indexed by two separate ordinal variables, for being *able to rely on* and *open up to* (one's) *partner*—each running from 1 (hardly ever (or never)) to 3 (often). Next, *relationship satisfaction* was a two-item standardized summary index, comprised of self-reported happiness in, and emotional satisfaction with, the relationship. Cronbach's alpha (Cronbach, 1951) for the combination of these two Likert scales was 0.72. Sexual activity was indexed by self-reported *frequency of sex* in the preceding year, and ranged from 0 (no sex last year) to 5 (once a day or more). Sex and sexual activity were both defined as "any mutually voluntary activity with another person that involves sexual contact, whether or not intercourse or orgasm occurs" (Waite et al., 2009). Similarly, participants reported on whether they had a *physically pleasureable relationship*, through an ordinal scale running from 0 (not at all) to 4 (extremely). Next, conservative sexual values were indicated by participants' perceptions of whether *love* was *necessary for sex*, and whether their *religion shaped* their *sexual behavior*—each Likert item ranging from 1 (strongly disagree) to 4 (strongly agree). Associations of these two indicators with the independent variables were examined separately. As noted, the outcomes also included levels (in pg/mL) of three sex hormones—*estradiol*, *testosterone*, and *DHEA*—derived from saliva samples taken during the biomeasure collection portion of the in-home interview (Gavrilova & Lindau, 2009). Following previously validated protocols (Granger et al., 2007), passive drool was used to collect whole unstimulated saliva, which was then frozen until

assay. Salivary enzyme immunoassays were conducted by Salimetrics Laboratories (State College, PA), using commercially available kits.

Finally, for both genders, five sexual problems were queried. These included *hypoactive sexual desire* (lack of interest in sex); *anorgasmia* (inability to achieve orgasm during intercourse); experiencing *pain during sex*; *anhedonia* (lack of pleasure in sex); and *anxiety about performance.* In addition, physiological arousal issues—trouble maintaining or achieving an erection (men) and lubrication problems (women)—were also examined in exploratory analysis. However, their associations with the independent religion variables failed to reach significance net of controls, and were therefore dropped in the final models. Data on sexual problems were collected in NSHAP through dichotomous response items, each asking the participant about the presence of a sexual problem for "several months or more" over the preceding 12 months (Laumann et al., 2008; Waite, Laumann, Das, & Schumm, 2009). Participants were only asked these questions if they reported any partnered sex in the past year. Those reporting a problem were also asked how much they were bothered by it, following the recommendations of a consensus panel on women's sexual dysfunctions (Basson et al., 2000). However, inclusion of personal distress into definitions of sexual problems or dysfunctions has been extensively critiqued (Laumann et al., 2008; Rosen & Laumann, 2003). Moreover, such a strategy would have lowered cell sizes below analytic tractability. Therefore, following the 2004 recommendations of the International Consultation on Erectile Dysfunction (Lue et al., 2004), this study only examined sexual problems *per se*. Finally, NSHAP women but not men reporting sex in the preceding year were also asked how often they *felt sexually aroused* ("turned on") during intercourse, with response categories ranging ordinally from 0 (never) to 4 (always).

Independent variables

A single dichotomous measure indexed *conservative Christian* status, relative to all *other religion*s. Participants were first asked about their "current religious preference." For those self-reporting a Protestant affiliation, the specific denomination or branch was then queried. Participants in a "Baptist" or "Methodist" denomination, who also attended religious services weekly or more, were coded as conservative Christians, or evangelicals. (It is acknowledged that U.S. evangelicalism subsumes a range of other churches. However, NSHAP response categories precluded a more inclusive classification—leading to potential bias in the analyses). The latter criterion was added to reflect literature indicating consistently better relationship (and hence, arguably, sexual) outcomes only among evangelicals who attended church regularly (Wilcox, 2006)—perhaps due to greater exposure to ideological and social pressures from the congregation.

To further explore the role of religious beliefs in conditioning these effects, this dichotomous variable was cross-categorized by "strongly agreeing" with the statement that religion shaped one's sexual behavior—the NSHAP religiosity item most directly linked to sex. This yielded dummy indicators for *conservative Christian, religion guides sex less*, and *conservative Christian, religion guides sex more*, with other religion as the reference. Similarly, variation in effects by partner support was examined by cross-categorizing Christian conservatism with self-reports on being able to open up to as well as rely on one's partner "often". Accordingly, dummy indicators were included for *conservative Christian, low partner support*, and *conservative Christian, high partner support*, with the reference category remaining the same.

Control variables

A participant's *age* was entered linearly as a continuous variable in all analyses. *Education*—proxying both greater knowledge or awareness of sexual issues, and socioeconomic status—was an integer score ranging from 1 (less than high school) to 4 (a Bachelor's degree or more). Race or ethnicity was indexed through a set of dummy variables for *Black* and *Hispanic/other*, with non-Hispanic *White* as the reference. Seventy-seven percent of women and 70% of men in the Hispanic/other category were non-Black Hispanics, with the remainder comprised of American Indians or Alaskan natives, Asian or Pacific Islanders, and "other." Next, all analysis adjusted for *diagnosed health conditions*. NSHAP participants were asked about any lifetime diagnoses of a range of medical conditions, of which nine—heart attack, arthritis, ulcers, asthma, stroke, hypertension, diabetes, cancer, and (among men) enlarged prostate—were combined into a single score based on the Charlson comorbidity index (Charlson, Pompei, Ales, & McKenzie, 1987; Williams, Pham-Kanter, & Leitsch, 2009). An additional control was added for current use of *sex hormone supplements*. NSHAP collected a complete log of currently used medications during the in-home interview, by direct observation using a computer-based log. The Multum® drug database, based on the hierarchical classifications of the American Hospital Formulary Service, was used for coding drug names (Qato, Schumm, Johnson, Mihai, & Lindau, 2009). Finally, all models for sex hormones adjusted for two additional factors: *saliva collection time of day* (in hourly units, on a 24-hour scale), and self-reported *hours since last food/drink*.

Statistical Analyses

All analyses were gender specific. Given the theoretical focus of the study, all models were restricted to those currently married. After dropping 16 missing observations for conservative Christianity, the maximum sample size for women was 724, and for men was 1,065. Eighty-five percent (N = 112) of conservative Christian men, and 77% (N = 953) of those in

other religions, were married. Among women, the corresponding proportions were 61% (N = 95) and 54% (N = 629), respectively, with those widowed comprising the bulk of the remainder in each case. As the last section makes clear, dependent variables included continuous, ordinal, as well as dichotomous measures. Accordingly, results are from OLS, ordinal logit, and logistic regression models, respectively. To facilitate pattern-visualization, coefficients rather than odds ratios are presented for categorical outcomes. Table 3 reports results for associations among women of conservative Christianity with relationship and sexual outcomes, as well as sex hormones—along with variations in these effects by subjective religiosity, and by partner support. To further validate the coding of the independent variables—i.e., ensure that they captured the social groups and processes of interest—two indicators of conservative sexual values (religion shaping sexual behavior, and love being necessary for sex) were also included in the dependent variables. Corresponding results for men are presented in Table 4.

All analyses were conducted with the STATA 12.0 statistical package (Stata Corp., 2011). Results were weighted using *svy* methods for complex survey data, first using population weights that adjusted for the intentional oversampling of Blacks and Hispanics, and also incorporated a non-response adjustment based on age and urbanicity (O'Muircheartaigh et al., 2009). Standard errors were adjusted for sample stratification (sampling strata independently) and clustering (sampling individuals within each of 100 primary sampling units).

RESULTS

Table 2 presents summary statistics for all dependent and control variables used in the analyses, stratified by conservative Christian status.

Women's Outcomes

Both sexual and relationship factors were generally better among conservative Christian women than those in other religious groups (Table 3). Consistent with prior literature, these women had better partner support—being able to rely on (Coeff. = 0.93) and open up to (Coeff. = 1.17) their spouses more—and, correspondingly, more relationship satisfaction (Coeff. = 0.27). Frequency of sex in the preceding year (Coeff. = 0.65), as well as physical pleasure in the relationship (Coeff. = 0.57), was greater for conservative Christian women compared to other religious groups. These women also had more conservative sexual values—more likely than women in other religions to perceive love as necessary for sex (Coeff. = 0.69), and that religion shaped their sexual behaviors (Coeff. = 1.00). Among those sexually active (with any intercourse last year), evangelical women were also less likely to report hypoactive sexual desire (Coeff. = -0.62) or performance anxiety (Coeff. = -1.27), and experienced more subjective arousal (Coeff. = 0.43). However, their estradiol levels were also lower (Coeff. = -2.05).

Next, associations were more uniformly positive for conservative Christians who reported that religion guided their sex life more, relative to those in other religions. Thus, it was only these evangelical women who reported greater partner support—being able to rely on (Coeff. = 1.25) and open up to (Coeff. = 1.53) their spouse; higher relationship satisfaction (Coeff. = 0.36); more frequent sex (Coeff. = 0.58) and physical pleasure (Coeff. = 0.79)—as well as a higher likelihood of perceiving love to be necessary for sex (Coeff. = 1.14). Similarly, among those sexually active, it was only these women who experienced less performance anxiety (Coeff. = -1.25)—although they also had lower estradiol levels (Coeff. = -2.37). In contrast, no examined outcome was more likely among evangelical women with lower subjective religiosity. However, these women did have lower testosterone levels than those in other religions (Coeff. =

-7.09)—and, among those with intercourse in the past year, a lower likelihood of anorgasmia (Coeff. = -0.69).

Finally, outcomes were also more uniformly positive among evangelical women with than those without more partner support. Specifically, relative to women in other religious groups, it was only the former who had more sex last year (Coeff. = 0.78), more physical pleasure (Coeff. = 0.84) and higher relationship satisfaction (Coeff. = 0.45)—as well as a higher likelihood of reporting that love was necessary for sex (Coeff. = 0.98), and that religion guided their sexual behavior (Coeff. = 1.19). Similarly, among those sexually active, likelihood of hypoactive sexual desire (Coeff. = -0.64) or performance anxiety (Coeff. = -1.48) were also lower only among these women, and their subjective arousal higher (Coeff. = 0.46). Moreover, it was also these women who had lower estradiol levels (Coeff. = -2.22). In contrast, none of the outcomes were significantly better among evangelical women with low partner support than those in the reference category. However, the former did report lower satisfaction in the relationship (Coeff. = -0.57)—and among sexually active women, more anorgasmia (Coeff. = 1.61).

Men's Outcomes

Men's differentials (Table 4) seemed somewhat less uniform than women's. As with their female counterparts, married evangelical men did have generally better relationship features than those in other religions. These included more partner support—i.e., being able to open up to one's spouse (Coeff. = 0.67)—and higher relationship satisfaction (Coeff. = 0.18). Similarly, these men were also more conservative in their values—more likely to believe that love was necessary for sex (Coeff. = 0.48), and that religion guided their sexual behaviors (Coeff. = 1.14). Overall, however, evangelical men's relational and attitudinal patterns seemed less consistently

matched than women's by better sexual outcomes—with these men no more likely to report frequent sex or physical pleasure in the relationship than those in other religions. Among those sexually active, they did experience less anhedonia (Coeff. = -2.87). Moreover, as with women's estradiol, these men also had lower androgen levels—both testosterone (Coeff. = -18.78) and its precursor, DHEA (Coeff. = -16.79).

With regard to subjective religiosity, relationship satisfaction (Coeff. = 0.33) was higher only among evangelical men who reported that religion guided their sex life more, relative to those in other religions. Moreover, only these men reported more physical pleasure in the partnership (Coeff. = 0.53)—and that love was necessary for sex (Coeff. = 2.33). Partner support (opening up to a partner), in contrast, was better among evangelical men with higher (Coeff. = 0.82) as well as lower (Coeff. = 0.78) subjective religiosity. Also, among sexually active men, it was only this latter group that reported less pain during sex (Coeff. = -14.58)—with anhedonia lower among more (Coeff. = -14.53) as well as less (Coeff. = -2.07) religious evangelical men. Moreover, it was also only the latter who had lower androgen levels—both testosterone (Coeff. = -24.60) and DHEA (Coeff. = -23.48)—than men in other religions.

Finally, again consistent with women's patterns, evangelical men's outcomes were somewhat stratified by more partner support—with relational satisfaction (Coeff. = 0.28) and physical pleasure (Coeff. = 0.67) higher only for those with this asset. Similarly, it was these men who had more conservative sexual values—more likely to report that love was necessary for sex (Coeff. = 0.77) and that their religion guided their sexual behaviors (Coeff. = 1.34). In contrast, evangelical men with low partner support also reported less physical pleasure in the relationship (Coeff. = -1.10) than those in other religions—and, among men with intercourse in the past year, more hypoactive sexual desire (Coeff. = 0.71). Sexual peformance anxiety,

however, was also lower in this group (Coeff. = -0.71). The same was true of pain during sex (Coeff. = -15.72), while anhedonia was lower among sexually active evangelical men with more (Coeff. = -2.51) as well as less (Coeff. = -14.57) partner support. Finally, androgen levels did not seem to vary by this factor. Associations with testosterone failed to reach significance, while DHEA was lower among conservative Christian men with less (Coeff. = -19.39) as well as more support from their partner (Coeff. = -16.22).

Supplementary Analysis: Employment, Education

Logistic regression models—controlling a participant's age, education and race—tested whether gender roles were more unequal among conservative Christians. The two dichotomous dependent variables in these analyses were self-reported *current employment* (whether full- or part-time), and *any college education* (whether a vocational certificate, an associate's degree, or a Bachelors or higher formal degree). In the results, married evangelical women reported significantly less current employment, relative to both women in other religions (Coeff. = -0.64) and to their male counterparts (Coeff. = -0.93). Among married evangelicals, moreover, women were strikingly less likely than men to have had any college education (Coeff. = -0.71).

Supplementary Analysis: Lifetime Sexual Partners

A final set of ordinal logit regression models—adjusting for the same factors as Tables 3 and 4—was used to examine life-course partnering patterns, as indicated by one's self-reported lifetime number of opposite-gender sexual partners. In the results, both conservative Christian women (Coeff. = -0.47) and men (Coeff. = -0.86) reported significantly fewer partners.

DISCUSSION

An emerging literature suggests that despite patriarchal gender roles, marital quality may perhaps be higher among conservative Christian (evangelical) older adults—particularly for

women, and those more religious—than their counterparts in other religions (Hypothesis 1, Table 1). In turn, this potential differential led to two further conjectures—lower sex-hormone levels among married evangelicals, especially those with more partner support (Hypothesis 2), and their better sexual outcomes than those in other religious groups (Hypothesis 3). Accordingly, data from a nationally representative probability sample of older U.S. adults were used to query relational, sexual, and hormone patterns among married evangelicals, relative to their counterparts in other religions; variations in these outcomes by their subjective religiosity; and by partner support. Women's results (Table 3) were generally consistent with better sexual outcomes and lower estradiol among conservative Christians—especially those more religious or with greater support from a spouse. In contrast, while married men's relational differentials were also per expectations (Table 4), their sexual and hormonal (androgen) patterns seemed less uniform than among women—reflecting perhaps a looser linkage between these sets of factors.

To recall, it was noted that extant literature on Christian conservatism and marital quality yields contradictory predictions, with some *feminist theory* perspectives assuming more relationship dissatisfaction among evangelical women due to traditional ideologies—and a newer wave of qualitative as well as probability-sample studies suggesting both genders' greater marital happiness in this group, due to evangelical men's recent shift to a *neotraditional* role combining patriarchy with more emotional availability and support (Hypothesis 1, Table 1). Results (Tables 3, 4) were generally consistent with the latter conjecture. As reported, supplementary analysis did support unequal gender roles among evangelicals, with married women in this community reporting significantly less current employment than those in other religions, as well as their male counterparts. Similarly, among married evangelicals, women were strikingly less likely than men to have had any college education. Despite these differentials, not only did these

women receive more support from their partner—and, correspondingly, reported more satisfaction with the relationship than their counterparts in other religions—but these outcomes were uniformly positive only among evangelical women with higher subjective religiosity (Table 3). Similarly, likelihood of being able to open up to a partner, and (hence) relationship happiness, were also higher among evangelical men—with the latter outcome better only among those more religious (Table 4).

Next, it was argued that these partnership differentials may also correspond to unexplored hormonal variations. Specifically, biomedical literature links lower sex-hormone levels (women's estradiol, men's androgens) with greater commitment to and investments in one's monogamous partnership—whether due to hormonal effects on these relational outcomes, or psychobiological effects of current or past partnerships on hormone levels. Accordingly, it was speculated that religious groups with systematically better partnership quality, such as evangelicals, may also exhibit lower average levels of these endogenous reproductive steroids (Hypothesis 2, Table 1). As conjectured, androgen (testosterone, DHEA) levels were significantly lower among conservative Christian men (Table 4), and estradiol among their female counterparts (Table 3), than those in other religions. Moreover, in stratified analyses, estradiol was lower only among evangelical women reporting a greater role of religion in their sex lives, and those more able to open up to and rely on their spouse (Table 3). Men's stratified results, however, were less consistent with expectations, with both androgens lower only among less religious evangelical men, and DHEA lower among those with more as well as less partner support (Table 4).

Finally, it was conjectured that if marital quality and support from a partner are indeed higher among conservative Christians than other religious groups, this might induce better sexual

outcomes among the former (Hypothesis 3, Table 1). Moreover, this differential may be especially strong among women, whose sexual desire and satisfaction have been consistently linked in the literature to emotional intimacy in the relationship. As reported above, separate analysis indicated that evangelical women as well as men had significantly fewer opposite-gender lifetime sexual partners. Despite these life-course patterns, married evangelical women reported more current sex and greater physical pleasure than women in other religions—and, among those with recent intercourse, fewer problems with sexual desire or performance anxiety, as well as more subjective arousal (Table 3)—consistent with positive sexual effects of their better relationships. (Eighty percent of these women—compared to only 65% of their counterparts in other religions—had had sex in the preceding year. Additionally, as noted, women's lubrication problems—along with men's erectile difficulties—were also queried in exploratory analysis, with both outcomes dropped in the final models due to a lack of significant associations with the religion predictors.) Moreover, as with the estradiol results above, these differentials seemed stratified by subjective religiosity, with only evangelical women reporting a greater role of religion in their sex lives having more intercourse and physical pleasure, as well as less performance anxiety. In contrast, conservative Christian men's better relationships were not as uniformly matched by positive sexual outcomes (Table 4)—reflecting perhaps a somewhat looser linkage between their sexual and partnership factors than among women. Despite their lower androgens, however, those in this group with intercourse in the past year (81%, compared to 75% of men in other religions) did report less anhedonia. In addition, among married evangelicals, only men with higher subjective religiosity reported more physical pleasure in the relationship. Unexpectedly, however, it was their *less* religious counterparts who reported fewer

problems with pain during sex. Men's anhedonia, on the other hand, was less frequent among evangelicals with as well as without these attitudes.

As with religiosity, stratification by partner support also yielded sexual differentials generally consistent with expectations (Hypothesis 3, Table 1)—with both women's (Table 3) and men's (Table 4) results indicating more uniformly positive outcomes among evangelicals more able to open up to and rely on a spouse. Specifically, it was evangelical women with more such support who reported more sex, more physical pleasure, and greater relationship satisfaction—and, among those with intercourse in the past year, fewer problems with sexual desire or performance anxiety, as well as more subjective arousal. In contrast, sexually active evangelical women with low support from a spouse also reported more anorgasmia. Men's patterns seemed similarly although less uniformly stratified, with only evangelical men with greater partner support reporting higher relationship satisfaction as well as physical pleasure. Those less able to rely on or open up to their spouse, in contrast, also reported less physical pleasure and (among those with recent intercourse) more hypoactive sexual desire than men in other religions. Contrary to expectations, however, they also had fewer problems with pain during sex—while anhedonia was less likely among evangelical men with or without partner support.

Overall, then, findings from this nationally-representative study suggested that despite facing greater patriarchy, evangelical older women may experience better marital quality than those in other religions—perhaps due to the decades-long church-promoted transformation of their male counterparts into authoritative-yet-supportive "soft patriarchs" (Wilcox, 2004, p. 53). Moreover, these psychosocial assets also seemed to induce positive sexual effects, with conservative Christian women—especially those more religious, and/or with more partner

support—reporting consistently better sexual outcomes and fewer problems with intercourse. These linkages held despite their lower estradiol levels. While the influence of this hormone on women's sexual behavior and motivation remains debated, some small-sample analyses do suggest such linkages (Dennerstein, Randolph, Taffe, Dudley, & Burger, 2002; Pitkin & Rees, 2008; Wylie et al., 2010). If so, findings from the present study suggest that the positive sexual effects of evangelical women's better relationships may outweigh potentially negative influences of their lower estradiol. While men in this group also appeared to experience more satisfactory partnerships, their sexual patterns were less consistent—perhaps reflecting a gender differential in the linkage between these two sets of factors.

Limitations

There were several limitations to this study. Most importantly, given the cross-sectional data, temporal order and causal direction could not be demonstrated—for instance, between partner support and sexual outcomes. Additionally, the NSHAP data contained no information about a spouse's religious affiliations, attitudes, or behaviors. Hence, inferences about evangelical partners providing more support had to be based on a participant's own ratings. More generally, other than salivary hormone levels, all analyses were based on self-reports, which provided no direct evidence of sexual or relational patterns—making participants' differential sensitivity to the same factors a potential problem. Cell sizes were small for many of the models—such as differentials by subjective religiosity and partner support among evangelicals; and sexual problems, queried only for the subsample with recent intercourse—although, that multiple associations reached significance despite this low power testifies to their strength. The present study should thus be seen as a broad analysis that establishes baseline linkages and lays the groundwork for deeper examination.

Summary

Data from a nationally representative probability sample suggested that consistent with previous studies on younger age groups, evangelical men and especially women in late life had more support from a partner and (hence) better marital quality than their counterparts in other religions. In keeping with a sparse recent literature, they also had lower sex hormone levels—whether because psychobiological aspects of their better relationships had lowered their hormones, or because those with more of these endogenous reproductive steroids had selected into less "traditional" partnership trajectories and worse current marriages. Moreover, at least among women, evangelicals' better marriages also seemed to induce positive sexual effects, with these women reporting consistently better sexual outcomes than those in other religions—especially when they had more spousal support and/or greater subjective religiosity. Men's relationship differentials were less uniformly matched by their sexual patterns, reflecting perhaps a somewhat looser linkage between these sets of factors than among women.

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Table 1: Summary of hypotheses.

Relative to those in other religious groups, conservative Christian older adults—particularly women, and those with greater subjective religiosity—will experience:
1. better marital quality, as indicated by greater support from a partner and more relationship satisfaction; and, especially when they have such support:
2. lower sex hormone levels; and
3. better sexual outcomes as well as a lower likelihood of sexual problems.

Table 2: Descriptive Statistics for Variables Used in Analyses: Means (Standard Errors)

	Control variables									**Dependent variables**		
	Demographic attributes					**Other controls**		**Controls for hormone models**		**Partner support**		**Relationship, sex**
	Age[a]	Education[b]	*White*[c]	Black[c]	Hispanic/ other[c]	Diagnosed health conditions[b]	Sex hormone supplements[c]	Saliva collection time of day[d]	Hours since last food/ drink	Able to rely on partner[b]	Able to open up to partner[b]	Relationship satisfaction[a]
WOMEN'S MEANS (SE)												
Among other religions	66.67 (0.25)	2.63 (0.06)	***0.85***^ *(0.02)*	0.05 (0.01)	**0.09**^ (0.02)	1.42 (0.04)	**0.16**^ (0.02)	15.47 (0.18)	2.97 (0.14)	2.78 (0.02)	2.70 (0.02)	0.05 (0.04)
N	629	629	*627*	627	627	629	624	534	549	626	629	629
Among conservative Christians	67.47 (0.74)	2.55 (0.12)	*0.76 (0.05)*	**0.22**^ (0.05)	0.02 (0.02)	1.34 (0.18)	0.08 (0.03)	15.42 (0.70)	3.00 (0.29)	**2.90**^ (0.03)	**2.86**^ (0.05)	**0.27**^ (0.08)
N	95	95	*95*	95	95	95	94	83	86	95	94	95
MEN'S MEANS (SE)												
Among other religions	67.05 (0.38)	2.77 (0.06)	**0.83**^ (0.02)	0.06 (0.01)	**0.11**^ (0.02)	1.48 (0.05)	0.03 (0.01)	15.50 (0.18)	3.02 (0.13)	2.88 (0.02)	2.73 (0.02)	0.34 (0.03)
N	953	953	950	950	950	953	946	865	873	953	953	952
Among conservative Christians	67.31 (0.69)	2.89 (0.14)	0.75 (0.05)	**0.23**^ (0.05)	0.02 (0.01)	1.59 (0.12)	0.03 (0.02)	15.68 (0.38)	2.91 (0.24)	2.92 (0.05)	**2.85**^ (0.04)	0.47 (0.09)
N	112	112	112	112	112	112	111	105	106	111	112	112

	Dependent variables												
	Relationship, sex		**Conservative sexual values**		**Sex hormones (pg/mL)**			**Sexual problems[e]**					**Arousal**
	Frequency of sex[b]	Physically pleasureable relationship[b]	Love necessary for sex[b]	Religion shaped sexual behavior[b]	Estradiol[a]	Testosterone[a]	DHEA[a]	Hypoactive sexual desire[c]	Anorgasmia[c]	Pain during sex[c]	Anhedonia[c]	Anxiety about performance[c]	Felt sexually aroused[b]
WOMEN'S MEANS (SE)													
Among other	1.23	2.72	3.53	3.16	**10.64**^	45.75	43.78	**0.47**^	0.35	0.20	0.25	**0.12**^	2.87

religions	(0.04)	(0.06)	(0.04)	(0.05)	(1.00)	(1.14)	(2.13)	(0.03)	(0.03)	(0.02)	(0.03)	(0.02)	(0.06)
N	575	607	537	537	513	457	476	357	336	358	353	354	349
Among conser-	**1.62^**	**2.97^**	**3.73^**	**3.64^**	7.15	46.23	48.11	0.35	0.33	0.14	0.19	0.06	2.99
vative Christians	(0.11)	(0.11)	(0.06)	(0.06)	(0.46)	(2.88)	(5.66)	(0.06)	(0.05)	(0.05)	(0.05)	(0.03)	(0.11)
N	86	92	85	87	79	71	73	67	67	68	66	67	65
MEN'S MEANS (SE)													
Among other	1.51	3.15	2.97	2.82	9.96	95.27	**59.02^**	0.28	0.19	0.03	**0.06^**	0.25	
religions	(0.05)	(0.03)	(0.03)	(0.04)	(0.54)	(7.07)	(3.57)	(0.02)	(0.02)	(0.01)	(0.01)	(0.02)	
N	875	915	794	795	845	805	819	637	624	632	634	631	
Among conser-	1.53	3.21	**3.17^**	**3.38^**	9.43	82.18	45.74	0.35	0.21	0.03	0.01	0.29	
vative Christians	(0.11)	(0.13)	(0.09)	(0.10)	(0.97)	(6.54)	(4.20)	(0.04)	(0.07)	(0.03)	(0.01)	(0.05)	
N	93	109	81	84	100	96	98	79	78	81	80	79	

Note: All estimates restricted to those currently married. Italicization denotes reference category in subsequent analyses. All estimates are weighted to account for differential probabilities of selection and differential nonresponse. Design-based standard errors are given in parentheses.

[a]Continuous variable.

[b]Ordinal variable.

[c]Dummy variable.

[d]In hourly units, on 24-hours scale.

[e]Asked only of participants reporting any partnered sex in preceding year.

+ $p < .10$; * $p < .05$; ** $p < .01$.

^ Mean significantly different at $p < .10$ than in other religious category, per t-test.

Table 3: Associations of Current Religion with Partnership, Sexual, and Sex Hormone Outcomes Among Married U.S. Women Aged 57-85: Coefficients (Standard Errors).

	Partner support		**Relationship and sex**			**Conservative sexual values**		**Sex hormones (pg/mL)**
	Able to rely on partner[a]	Able to open up to partner[a]	Relationship satisfaction[b]	Frequency of sex[a]	Physically pleasureable relationship[a]	Love necessary for sex[a]	Religion shaped sexual behavior[a]	Estradiol[b]
Religion (ref: other religion)								
Conservative Christian	**0.93****	**1.17****	**0.27****	**0.65****	**0.57***	**0.69***	**1.00****	**-2.05***
	(0.31)	(0.40)	(0.08)	(0.20)	(0.22)	(0.32)	(0.22)	(0.91)
N	713	715	716	655	693	617	619	583
Religion and subjective religiosity (ref: other religion)								
Conservative Christian, religion guides sex less	0.73	0.73	-0.01	0.71	0.00	0.08	—[e]	-1.57
	(0.55)	(0.59)	(0.17)	(0.53)	(0.45)	(0.43)		(1.48)
Conservative Christian, religion guides sex more	**1.25***	**1.53****	**0.36****	**0.58****	**0.79****	**1.14*^**	—[e]	**-2.37***
	(0.54)	(0.51)	(0.11)	(0.18)	(0.28)	(0.45)		(0.95)
N	705	708	708	649	686	616		578
Religion and partner support (ref: other religion)								
Conservative Christian, low partner support	—[e]	—[e]	**-0.57***	-0.24	-0.83	-0.51	0.10	-1.29
			(0.27)	(0.61)	(0.50)	(0.49)	(0.48)	(1.81)
Conservative Christian, high partner support	—[e]	—[e]	**0.45**^**	**0.78**^**	**0.84**^**	**0.98*^**	**1.19**^**	**-2.22***
			(0.08)	(0.19)	(0.25)	(0.37)	(0.27)	(0.89)
N			716	655	693	617	619	583

	Sex hormones (pg/mL)		**Sexual problems[d]**					**Arousal**
	Testosterone[b]	DHEA[b]	Hypoactive sexual desire[c]	Anorgasmia[c]	Pain during sex[c]	Anhedonia[c]	Anxiety about performance[c]	Felt sexually aroused[a]
Religion (ref: other religion)								
Conservative Christian	0.25	5.59	**-0.62***	-0.17	-0.19	-0.44	**-1.27***	**0.43+**
	(3.20)	(6.88)	(0.27)	(0.26)	(0.54)	(0.44)	(0.53)	(0.23)
N	522	542	421	402	424	416	419	412
Religion and subjective religiosity (ref: other religion)								
Conservative Christian, religion guides sex less	**-7.09+^**	-2.43	-0.71	**-0.69+**	-0.79	-0.64	-1.00	0.69
	(3.80)	(10.17)	(0.51)	(0.37)	(0.84)	(0.59)	(0.95)	(0.44)

Conservative Christian, religion guides sex more	3.80 (3.77)	10.44 (8.27)	-0.48 (0.32)	0.02 (0.39)	0.10 (0.60)	-0.24 (0.53)	**-1.25+** (0.62)	0.28 (0.31)
N	519	539	417	398	420	412	415	410
Religion and partner support (ref: other religion)								
Conservative Christian, low partner support	-1.98 (6.48)	8.11 (15.76)	-0.30 (0.71)	**1.61*^** (0.71)	-0.22 (1.17)	0.14 (0.97)	-0.08 (0.77)	0.11 (0.60)
Conservative Christian, high partner support	0.71 (3.43)	5.05 (7.31)	**-0.64*** (0.28)	-0.33 (0.28)	-0.19 (0.56)	-0.49 (0.47)	**-1.48*** (0.63)	**0.46+** (0.24)
N	522	542	421	402	424	416	419	412

Note: All analyses restricted to those currently married. All models control a participant's age, education, race/ethnicity, number of diagnosed health conditions, and current use of sex hormone supplements. Models for sex hormones also control saliva collection time of day, and hours since last food/drink. All estimates are weighted to account for differential probabilities of selection and differential nonresponse. Design-based standard errors are given in parentheses.

[a]Ordinal outcome. Results are from ordinal logit regression models.

[b]Continuous outcome. Results are from OLS regression models.

[c]Dummy outcome. Results are from logistic regression models.

[d]Asked only of participants reporting any partnered sex in preceding year.

[e]Independent variable stratified by dependent variable(s).

+ $p < .10$; * $p < .05$; ** $p < .01$.

^ Association significantly different at $p < .10$ than for other included religious category, per Wald test.

Table 4: Associations of Current Religion with Partnership, Sexual, and Sex Hormone Outcomes Among Married U.S. Men Aged 57-85: Coefficients (Standard Errors).

	Partner support		**Relationship and sex**			**Conservative sexual values**	
	Able to rely on partner[a]	Able to open up to partner[a]	Relationship satisfaction[b]	Frequency of sex[a]	Physically pleasureable relationship[a]	Love necessary for sex[a]	Religion shaped sexual behavior[a]
Religion (ref: other religion)							
Conservative Christian	0.45	**0.67***	**0.18***	0.14	0.29	**0.48***	**1.14****
	(0.47)	(0.27)	(0.07)	(0.18)	(0.27)	(0.21)	(0.21)
N	1053	1054	1053	959	1015	868	873
Religion and subjective religiosity (ref: other religion)							
Conservative Christian, religion guides sex less	-0.24	**0.78+**	-0.02	-0.29	-0.12	**-0.59****	—[e]
	(0.65)	(0.42)	(0.15)	(0.36)	(0.38)	(0.17)	
Conservative Christian, religion guides sex more	1.58	**0.82+**	**0.33**^**	0.56	**0.53+**^	**2.33**^**	—[e]
	(1.01)	(0.45)	(0.05)	(0.36)	(0.28)	(0.31)	
N	1026	1026	1025	939	989	867	
Religion and partner support (ref: other religion)							
Conservative Christian, low partner support	—[e]	—[e]	-0.17	0.08	**-1.10***	-0.37	0.42
			(0.21)	(0.34)	(0.54)	(0.34)	(0.55)
Conservative Christian, high partner support	—[e]	—[e]	**0.28**^**	0.16	**0.67**^**	**0.77**^**	**1.34****
			(0.05)	(0.28)	(0.19)	(0.26)	(0.25)
N			1053	959	1015	868	873

	Sex hormones (pg/mL)			**Sexual problems[d]**				
	Estradiol[b]	Testosterone[b]	DHEA[b]	Hypoactive sexual desire[c]	Anorgasmia[c]	Pain during sex[c]	Anhedonia[c]	Anxiety about performance[c]
Religion (ref: other religion)								
Conservative Christian	-0.66	**-18.78+**	**-16.79****	0.01	0.15	0.10	**-2.87****	0.15
	(1.09)	(9.85)	(5.07)	(0.26)	(0.45)	(1.03)	(0.97)	(0.27)
N	935	891	907	712	698	710	710	706
Religion and subjective religiosity (ref: other religion)								
Conservative Christian,	-0.30	**-24.60***	**-23.48****	0.45^	0.21	**-14.58**^**	**-2.07*^**	-0.41

religion guides sex less	(1.81)	(11.24)	(6.91)	(0.35)	(0.62)	(0.67)	(0.99)	(0.41)
Conservative Christian,	-0.39	-17.24	-9.37	-0.94	0.01	1.09	**-14.53****	0.30
religion guides sex more	(1.81)	(13.98)	(8.06)	(0.61)	(0.66)	(1.17)	(0.26)	(0.38)
N	911	868	883	695	682	692	692	688
Religion and partner support (ref: other religion)								
Conservative Christian,	-0.87	-38.04	**-19.39***	**0.71***	-0.67	**-15.72**^**	**-14.57****	**-0.71+^**
low partner support	(2.49)	(23.31)	(8.98)	(0.33)	(0.77)	(0.83)	(0.65)	(0.42)
Conservative Christian,	-0.61	-14.52	**-16.22****	-0.24	0.34	0.42	**-2.51*^**	0.39
high partner support	(1.31)	(11.09)	(5.45)	(0.44)	(0.42)	(0.98)	(0.96)	(0.28)
N	935	891	907	712	698	710	710	706

Note: All analyses restricted to those currently married. All models control a participant's age, education, race/ethnicity, number of diagnosed health conditions, and current use of sex hormone supplements. Models for sex hormones also control saliva collection time of day, and hours since last food/drink. All estimates are weighted to account for differential probabilities of selection and differential nonresponse. Design-based standard errors are given in parentheses.

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+ $p < .10$; * $p < .05$; ** $p < .01$.

^ Association significantly different at $p < .10$ than for other included religious category, per Wald test.