Sexuality & Culture (2021) 25:167–188
https://doi.org/10.1007/s12119-020-09764-y

ORIGINAL PAPER

How Much Do We Really Know About Sociosexuality in Ghana?

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Published online: 11 June 2020
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Abstract

Sociosexuality describes a person's willingness and preparedness to engage in uncommitted sexual activity with various sexual partners. Sociosexuality has important implications for sexual health and HIV prevention because it mostly involves willingness to engage in casual sex. Yet to date, there are no prior studies on sociosexuality and its correlates in Ghana. To fill this gap, this study explored the association between sociosexuality (attitude, desire, and behaviour), gender, sexual sensation seeking, sexual attitudes, and religiosity in romantic relationships among participants ($N = 315$; men = 164, women = 151) from Ayawaso West Wuogon municipality in the Greater Accra Region of Ghana. Data were analysed using Hierarchical Multiple Regression. Results showed that, compared with women, men reported higher unrestricted sociosexuality. Further, sexual sensation seeking and sexual attitudes were positively associated with sociosexuality. However, personal religiosity was not associated with sociosexuality. Sexual attitudes interacted with sexual sensation seeking in influencing sociosexuality. Our results suggest that some Ghanaian men seem to view uncommitted sex as an appropriate sexual behaviour, consistent with prevailing masculine sexual script norms. The findings indicate that sexual risk reduction programmes in Ghana should target sociosexuality and sexual sensation seeking.

Keywords Sociosexuality · Sexual sensation seeking · Religiosity · Ghana

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Introduction

Sociosexuality, also known as sociosexual orientation, describes a person's willingness to engage in sexual activity with various sexual partners (Nascimento et al. 2018; Simpson and Gangestad 1991). In other words, sociosexuality reflects a person's endorsement of and engagement in casual sex (Yost and Zurbriggen 2006). Sociosexuality, considered a personality trait, captures the individual differences in sexual attitudes, motivation, and behaviour (Simpson and Gangestad 1991). It is said to operate on a continuum from *restricted* sociosexuality to *unrestricted* sociosexuality. People with *unrestricted* sociosexuality are said to be more promiscuous in their sociosexual orientation, whereas those with *restricted* sociosexuality are said to be more monogamous in their sociosexual orientation (Gettler et al. 2019; Penke and Asendorpf 2008; Webster et al. 2015). To assess sociosexuality, Simpson and Gangestad (1991) developed and validated the Sociosexual Orientation Inventory (SOI). We used the 9-item revised Sociosexual Orientation Inventory (SOI-R) by Penke and Asendorpf (2008) in this study.

Casual sex has important implications for sexual health and HIV prevention. For example, a person with unrestricted sociosexual orientation may engage in sexual activity with several people in a lifetime, which sexual risk behaviour could give rise to unwanted pregnancy and sexually transmitted infections, including HIV. For this reason, numerous studies have examined sociosexuality and its correlates such as sociosexuality and sexual behaviour (Hall and Pichon 2014), sociosexuality and HIV (Hall 2012), sociosexuality and sexual aggression (Cleveland et al. 2019; Testa and Hone 2019), sociosexuality and relationship commitment (Markey and Markey 2013), sociosexuality and ideal partner preferences (Brown et al. 2019; Nascimento et al. 2018), sociosexuality and jealousy (Peters et al. 2014), sociosexuality and relationship satisfaction (Webster et al. 2015), and sociosexuality and orgasmic function in casual versus committed sex (Wongsomboon et al. 2020). Yet, to date, there are no prior studies on sociosexuality and the factors that predict it in Ghana. Consequently, little is known about sociosexuality in Ghana. Because human sexuality is mostly expressed within a cultural context, it would be useful to investigate the predictors of sociosexuality in Ghana. Understanding sociosexuality in the Ghanaian cultural context would not only help to extend the sociosexuality literature, but also it would offer additional insights into human mating and advance knowledge for theory building.

Sociosexuality and Gender

In a seminal study across 48 nations, Schmitt (2005) demonstrated that there were cross-cultural differences in sociosexuality, and that men and women differed significantly in their sociosexual orientation. For example, Schmitt (2005) observed that, in most countries with political and economic gender equality, men were slightly more sociosexually unrestricted than were women, whereas in countries with greater reproductive expectations (and lower gender equality), men were greatly more

sociosexually unrestricted than were women. See also the following meta analyses (Petersen and Hyde 2010, 2011; Oliver and Hyde 1993) for more information on gender differences in human sexuality. The between-gender variability in sociosexuality has been reported in other research. In a recent study, Neto (2015) investigated gender differences in sociosexuality among 475 heterosexual men and women in Portugal. Consistent with previous research, Neto (2015) reported that, compared with women, men demonstrated more unrestricted sociosexuality. In another work among 168 participants, Yost and Zubriggen (2006) reported that unrestricted sociosexuality (high sociosexuality) was positively associated with a greater number of lifetime sex partners for both men and women. In addition, the authors noted that whilst unrestricted sociosexuality related positively to higher sexual conservatism for men, unrestricted sociosexuality positively predicted sexual fantasies and low sexual conservatism for women. Following this research, we propose the following hypothesis (H).

H1 Men would report a more unrestricted sociosexual attitude, sociosexual desire, and sociosexual behaviour than women.

Sociosexuality and Sexual Attitudes

Research has shown that there is a relationship between sociosexuality and sexual attitudes (Yost and Zurbriggen 2006). Earlier work suggests that sexual attitudes combine with sexual behaviour to bring about sociosexuality (Simpson and Gangestad 1991, 1992). Yost and Zurbriggen (2006) observed that people with unrestricted sociosexual orientation engaged in sexual activity more often and had greater number of lifetime sexual partners. Other work has shown that people who score high on sociosexuality tend to engage in greater sexual infidelity (Treger and Sprecher 2011). Following this research, we propose the following hypotheses.

H2 Sexual attitudes would have a positive relationship with sociosexual attitude, sociosexual desire, and sociosexual behaviour.

H3 Sexual attitudes would moderate the relationship between sexual sensation seeking and sociosexual attitude, sociosexual desire, and sociosexual behaviour. That is, sexual attitudes will enhance the effect of sexual sensation seeking on sociosexuality. Specifically, when sexual attitudes are more favourable, sexual sensation seeking will have a stronger positive effect on sociosexual attitude, sociosexual desire, and sociosexual behaviour than when sexual attitudes are unfavourbale.

Sociosexuality and Sexual Sensation Seeking

Sexual sensation seeking arises when a person seeks exciting, new, and risky sexual experiences (Kalichman and Rompa 1995). Kalichman et al. (1994) describes sexual sensation seeking as “the propensity to attain optimal levels of sexual excitement and to engage in novel sexual experiences” (p. 387). Viewed

from this perspective, sexual sensation seeking would seem to be conceptually related to sociosexuality. Both concepts involve engagement in sexual activity with multiple partners for pleasure. Sexual sensation seeking increases a person's vulnerability for acquisition and transmission of STIs (Spitalnick et al. 2007). People with heterosexual sexual orientation are known to engage in more frequent sexual sensation seeking than do people with homosexual sexual orientation (Gil-Llario et al. 2015). There is evidence that sexual sensation seeking is associated with sociosexuality and sexual attitudes (Zheng and Zheng 2014). From this literature, we propose the following hypothesis.

H4 Sexual sensation seeking would have a positive relationship with sociosexual attitude, sociosexual desire, and sociosexual behaviour.

Sociosexuality and Religiosity

Ghana is largely a religious nation (Heaton et al. 2009). Available population and housing census data show that 71.2% of Ghanaians are Christians whereas 17.6% are Muslims. About 5.2% profess traditional religion and 5.3% are not affiliated to any religious faith (Ghana Statistical Service 2012). Religiosity has long been considered to impact human sexual behaviour (Ahrold et al. 2011; Bassett et al. 1999; Brelsford et al. 2011). Schmitt and Fuller (2015) investigated associations between religiosity and sexual behaviour in a cross-national study in eight regions of the world. They found that, from North America to East Asia, higher personal religiosity, described as personal devotion to a divinity in both body and spirit through personal scripture study, personal prayer, and dedication to religious rituals, was related to lower sexual permissiveness. Rowatt and Schmitt (2003) found that personal religiosity was positively associated with restricted sociosexual orientation. In other words, people who are higher in personal religiosity tend to have a lower desire for a large number of lifetime sexual partners. Other work noted that regular religious service attendance was negatively associated with extramarital sexual affair and permissive sexual conduct (Trinitapoli and Regnerus 2006). Penke and Asendorpf (2008) argued that religion helps to shape sociosexual values and that a person's religiosity should regulate his or her sociosexual attitude. From this literature, we propose the following hypotheses.

H5: Personal religiosity would have a negative relationship with sociosexual attitude, sociosexual desire, and sociosexual behaviour.

H6: Personal religiosity would moderate the relationship between sexual sensation seeking and sociosexual attitude, sociosexual desire, and sociosexual behaviour. That is, personal religiosity will buffer the effect of sexual sensation seeking on sociosexuality. Specifically, when personal religiosity is low, sexual sensation seeking will have a stronger negative effect on sociosexual attitude, sociosexual desire, and sociosexual behaviour than when personal religiosity is high.

Sociosexuality and Personality

Previous research has demonstrated the role of human personality in sexual behaviour (Bourdage et al. 2007; Holtzman and Strube 2013). For example, a number of studies have reported associations between sociosexuality and the Big Five personality traits. This research indicates that extraversion predicts short-term mating and unrestricted sociosexuality whereas agreeableness predicts restricted sociosexuality (Schmitt and Shackelford 2008; Simpson et al. 2004). Personality traits are enduring characteristics that underlie individual differences in sociosexual attitude, desire, and behaviour (Bogaert et al. 2018). These differences in sociosexual orientation may emanate from patterns of behaviour, thought, and emotion shaped by mating strategy and sexual script. To prevent the personality variable from covarying with our dependent variable and confounding our results, we decided to treat it as a control variable in the current analysis.

Methods

Participants and Procedure

This study used cross-sectional survey research design. Three hundred and fifteen participants (men = 164, women = 151) provided data for the current analysis. The mean age of the sample was, $M = 26.79$ years (SD = 6.94), with ages ranging between 18 years and 58 years. Of this sample, 68.9% reported having tertiary education, 28.9% reported having secondary education, and 2.2% reported having basic education. Approximately, 36.5% said they were in full-time employment, 15.2% were in part-time employment, and 9.2% were unemployed. About 38.7% were university students pursuing various degrees. The sample was recruited in the Greater Accra Region of Ghana. Participants were recruited at their workplaces, community centers, and university campuses within Ayawaso West Wuogon Municipality, using a convenience sampling technique. Accra is the capital city of Ghana. Greater Accra Region was chosen for this study because it is a cosmopolitan city with people from diverse ethnic, educational, work, and cultural backgrounds. Accra also has a mix of people with diverse sexual orientation. The aims and objectives of the study were explained to those recruited by the researchers. Participants who expressed interest in the study were handed study questionnaires in envelopes to complete for collection later by the research team. In total, 362 questionnaires were administered and 315 were returned indicating a response rate of 87%. Participants were assured of the confidentiality of their participation and the anonymity of their responses. They were also informed that they could withdraw from the study at any time they so desired, and that they would not suffer any consequences for doing so. Participants did not receive any compensation for their participation. Inclusion criteria for participation in this study included being 18 years of age or older, having a current or a previous experience in a sexual relationship (sexually experienced), and a willingness to participate in the study. Approval for this study was obtained from the

Ethics Committee for the Humanities at the University of Ghana (Protocol Number: ECH045/18-19).

Measures

Demographic Information

Information on age, gender, educational level, religion, and employment status were obtained from the study participants.

The Revised Sociosexual Orientation Inventory

The 9-item revised version of Simpson and Gangestad's (1991) Sociosexual Orientation Inventory (SOI-R) by Penke and Asendorpf (2008) was used to assess sociosexuality. It is a self-report measure of individual differences in human mating strategies. It is a multidimensional scale with three subscales that assess various aspects of human mating behaviour, romantic fantasies, social feelings, and attitudes towards casual sex. The subscales are Attitude, Desire, and Behaviour. The Attitude subscale is rated on a Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Sample Attitude items include "I can imagine myself being comfortable and enjoying "casual" sex with different partners.", and "Sex without love is ok." The Desire subscale is rated on a Likert scale ranging from 1 (*never*) to 5 (*nearly every day*). Sample Desire items include "In everyday life, how often do you have spontaneous fantasies about having sex with someone you have just met?", and "How often do you experience sexual arousal when you are in contact with someone with whom you do *not* have a committed romantic relationship?". The Behaviour subscale asks respondents to indicate the number of persons they have had sexual intercourse within the past 12 months. Sample Behaviour items include "With how many different partners have you had sex within the past 12 months?", and "With how many different partners have you had sexual intercourse on *one and only one* occasion?". Participants were expected to choose from the options 1(*0 partners*) to 5 (*8 partners or more*). Total scale scores were calculated separately for each subscale and were treated as the independent variables in the analyses. Scale scores were calculated such that high SOI-R scores show that an individual is sociosexually unrestricted, whereas low SOI-R scores indicate that an individual is sociosexually restricted. Low scores could also suggest that a person pursues a monogamous mating strategy or invests emotionally in a long-term relationship. Cronbach's alpha coefficient for each subscale and stratified alpha coefficient for the total scale in this study are reported in Table 1.

The Big Five Inventory

Personality was assessed by the 44-item Big Five Inventory (BFI; Benet-Martinez and John 1998; John et al. 2008). It is a multidimensional inventory that assesses

Table 1 Internal consistency reliability of the measures used in the study

Measure	Number of items	Cronbach's alpha	Stratified alpha
Sociosexual orientation			.91
Attitude	3	.70	
Behaviour	3	.88	
Desire	3	.87	
Sexual sensation seeking	11	.90	
Sexual attitudes			.88
Permissiveness	10	.87	
Birth control	3	.76	
Communion	5	.74	
Instrumentality	5	.72	
Dimensions of religiosity			.95
Preoccupation	5	.86	
Conviction	5	.86	
Emotional involvement	5	.87	
Guidance	4	.79	
Personality			.73
Extraversion	3	.81	
Agreeableness	6	.66	
Conscientiousness	5	.62	
Neuroticism	4	.48	
Openness	4	.58	

five dimensions of personality. The facets are extraversion (8 items), agreeableness (9 items) openness (10 items), conscientiousness (9 items), and neuroticism (8 items). All of the five dimensions of personality are rated on a five-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*). The internal consistency reliability coefficients for the subscales of the BFI in previous research ranged from .79 to .87 (John et al. 2008). In this study, total scale scores were calculated separately for each of the five dimensions of personality. Total scale scores were calculated such that higher scores indicated greater agreeableness, extraversion, openness, neuroticism, and conscientiousness. Cronbach's alpha coefficient for each of the five dimensions and a stratified alpha coefficient for the full scale in this study are presented in Table 1.

Dimensions of Religiosity Scale

This is a self-report measure developed by Joseph and DiDuca (2007) to assess attitudes towards religiosity. It is a 20-item scale with four dimensions that assess various aspects of religiosity. The four dimensions are preoccupation ("I think about God all the time."), guidance ("I try to follow the laws laid down in the

Bible."), conviction ("I am certain that God is aware of everything I do."), and emotional involvement ("Prayer lifts my spirits."). All of the four dimensions are rated on a five-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*). The four subscales had Cronbach's alphas ranging from .87 to .93 in previous research (Joseph and DiDuca 2007). In this study, total scale scores were calculated separately for each of the four subscales. The subscale scores were then averaged to create total religiosity score for the analyses. Scale scores were calculated such that higher scores indicated greater religiosity. Cronbach's alpha coefficient for each of the four subscales and a stratified alpha coefficient for the whole scale in this study are presented in Table 1.

Brief Sexual Attitudes Scale

Sexual attitudes were assessed with the 23-item Brief Sexual Attitudes Scale (BSAS) developed by Hendrick, Hendrick, and Reich (2006). The BSAS has four subscales namely permissiveness ("Casual sex is acceptable."), birth control ("Birth control is part of responsible sexuality"), communion ("At its best, sex seems to be the merging of two souls."), and instrumentality ("Sex is best when you let yourself go and focus on your own pleasure."). All of the four subscales of the BSAS are rated on a five-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*). In this study, total scale scores were calculated separately for each of the four subscales. The subscale scores were then averaged to create total brief sexual attitudes score for the analyses. Scale scores were calculated such that higher scores indicated more favourable permissive sexual attitudes. The four subscales had Cronbach's alphas ranging from .73 to .95 in previous research (Hendrick et al. 2006). Cronbach's alpha coefficient for each subscale and a stratified alpha coefficient for the whole scale in this study are presented in Table 1.

Sexual Sensation Seeking Scale

Sexual sensation seeking was assessed with the 11-item Sexual Sensation Seeking Scale developed by Kalichman and Rompa (1995). It is a unidimensional scale. It is a Likert-type scale which measures the personality dimension of sensation seeking regarding sex. The scale responses are rated on a Likert scale from 1 (*not at all like me*) to 4 (*very much like me*). Sample items include "I am interested in trying out new sexual experiences", "I like wild 'uninhibited' sexual encounters.", "I enjoy the sensation of intercourse without a condom.", and "I like to have new and exciting sexual experiences and sensations". Kalichman and Rompa (1995) reported an internal consistency reliability of .79 for the scale. Gaither and Sellbom (2003) reported a Cronbach's alpha of .83 for men and .81 for women. In this study, scale scores were calculated such that higher scores indicated greater sexual sensation seeking. Cronbach's alpha coefficient for the scale in this study is presented in Table 1.

Results

Descriptive Results

Descriptive statistics were calculated on the demographic variables. The data were checked for normality, using cut-off indices of ± 2 for both skewness and kurtosis (Cain et al. 2017; Tabachnick and Fidell 2013). Scale items on some of the variables that violated the skewness and kurtosis criteria of ± 2 were deleted from the analyses. To investigate the construct dimensionality of the study variables, exploratory factor analyses (EFA) were performed on each variable. Because most of the main variables in this study have a multi-dimensional factor structure, EFAs were conducted separately on each subscale of a multi-dimensional scale. The principal component analysis (PCA) was used as the factor extraction method. Factorability of the data was examined with Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and Barlett's Test of Sphericity. To determine the number of factors to retain, Cattell's scree test and Kaiser's criterion were used. Minimum factor loading was determined using (≥ .40; Field 2009) for the retention of items. Items on some of the measures that loaded below this cut-off criterion were deleted from the analyses. Following the EFAs, internal consistency reliability was determined for each subscale, using Cronbach's alpha. To determine internal consistency reliability for a whole multi-dimensional scale in this study, we calculated stratified alpha reliability, following Moussa's (2016) recommendation. The Cronbach's alpha coefficients and stratified alpha coefficients are presented in Table 1. Following the calculation of the scale reliabilities, bivariate correlation was conducted between the study variables. The correlation matrix together with descriptive statistics is presented in Table 2. All analyses in this study were calculated in IBM SPSS version 21.0.

Regression Results

To test the main hypotheses in this study, we used hierarchical multiple regression following the recommendation by Cohen, Cohen, West, and Aiken (2003). The analyses were conducted in three steps. At Step 1, the dependent variable (i.e. sociosexuality) as well as the control variables (i.e. age, gender, educational level, and personality traits) were entered into the model. At Step 2, the independent variables (i.e. sexual sensation seeking, sexual attitudes, and dimensions of religiosity) were entered into the model. Prior to computing the interaction terms for the moderation model at Step 3, the predictor variable (i.e. sexual sensation seeking) and the moderating variables (i.e. sexual attitudes and dimensions of religiosity) were standardized. The moderating variables were created by calculating the product of the standardized scores. Standardization of the scores was done to reduce multi-collinearity and to enhance the interpretability of the interaction terms. The analyses were done separately for each of the three dependent variables in this study (i.e. sociosexual attitudes, sociosexual desire,

Table 2 Descriptive statistics and bivariate correlations between the study variables ($N = 315$)

Variable		*M*	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.	Age	26.79	6.94	–													
2.	Gender	0.48	0.50	−.27***	–												
3.	Education	2.67	0.52	.23***	−.22***	–											
4.	Extraversion	8.04	3.60	.04	.04	.03	–										
5.	Agreeableness	25.33	4.03	.08	−.08	.06	.03	–									
6.	Conscientiousness	19.9	3.57	.22***	−.05	.21***	.04	.47***	–								
7.	Neuroticism	10.62	3.24	−.23***	.15**	−.12*	−.10	−.23***	−.23***	–							
8.	Openness	15.98	2.89	−.06	−.05	.05	.09	.44***	.49***	−.16**	–						
9.	Sociosexual	6.16	3.56	.03	−.30***	.19**	−.00	−.10	−.02	−.00	−.02	–					
10.	Sociosexual behaviour	5.63	2.69	.18**	−.33***	.15**	.02	−.07	.00	−.07	−.02	.53***	–				
11.	Sociosexual desire	6.03	3.32	.06	−.38***	.17**	.03	−.10	−.06	−.06	−.06	.60***	.59***	–			
12.	Sexual sensation seeking	22.55	8.87	.09	−.32***	.16**	.10	−.18**	−.10	−.04	−.05	.53***	.55***	.62***	–		
13.	Sexual attitudes	17.91	3.97	−.02	−.25***	.05	.07	−.10	−.08	.03	.01	.48***	.40***	.47***	.53***	–	
14.	Religiosity	21.65	3.34	.05	.10	.03	−.02	.22***	.20***	−.05	.14*	−.14*	−.15**	−.16***	−.20**	−.19**	–

M Mean, *SD* Standard deviation

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

Table 3 Hierarchical multiple regression results predicting aspects of sociosexuality from sexual sensation seeking, sexual attitudes, and religiosity

Variables	Dependent variables								
	Sociosexual attitudes			Sociosexual desire			Sociosexual behaviour		
	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2	β
Step 1: Control variables	.13	.13***		.18	.18***		.13	.13***	
Age			−.08			−.07			.09
Gender			−.30***			−.38***			−.30***
Education			.16**			.11*			.07
Openness			.00			−.04			.01
Neuroticism			.01			−.04			−.01
Extraversion			.01			.05			.03
Agreeableness			−.14*			−.12			−.11
Conscientiousness			.02			−.03			−.00
Step 2: Independent variables	.37	.24***		.45	.27***		.35	.22***	
Sexual sensation seeking (SSS)			.34***			.46***			.41***
Sexual attitudes (SA)			.27***			.18**			.15**
Religiosity (R)			−.02			−01			−.04
Step 3: Moderating variables	.38	.01*		.49	.04***		.37	.02**	
SSS*SA			.13**			.21***			.11*
SSS*R			−.01			.03			.14**

Gender (0 = male, 1 = female); Education (1 = basic, 2 = secondary, 3 = tertiary)

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

and sociosexual behaviour), following the same hierarchical regression analytic strategy. The results of the linear hierarchical regression analyses are presented in Table 3.

As can be seen in Table 3, the model at Step 1 was statistically significant, accounting for 13% of the variance in sociosexual attitudes, 18% in sociosexual desire, and 13% in sociosexual behaviour. Specifically, results indicate that gender was a significant negative predictor of sociosexual attitudes (β = −.30, $p < .001$), sociosexual desire (β = −.38, $p < .001$), and sociosexual behaviour (β = −.30, $p < .001$). Educational level was a significant positive predictor of sociosexual attitudes (β = .16, $p < .01$), sociosexual desire (β = .11, $p < .05$) but not sociosexual behaviour. Agreeableness was a significant negative predictor of only sociosexual attitudes (β = −.14, $p < .01$).

In addition, the model at Step 2 was statistically significant, accounting for additional variance of 24% in sociosexual attitudes ($\Delta R^2 = .24$, $p < .001$), 27% in sociosexual desire ($\Delta R^2 = .27$, $p < .001$), and 22% in sociosexual behaviour ($\Delta R^2 = .22$, $p < .001$). Specifically, results indicate that sexual sensation seeking

was a significant positive predictor of sociosexual attitudes (β = .34, $p < .001$), sociosexual desire (β = .46, $p < .001$), and sociosexual behaviour (β = .41, $p < .001$). Further, sexual attitudes were a significant positive predictor of sociosexual attitudes (β = .27, $p < .001$), sociosexual desire (β = .18, $p < .01$), and sociosexual behaviour (β = .15, $p < .05$). Personal religiosity had a negative relationship with sociosexuality but this relationship was not statistically significant. The results provide support for hypothesis one, which stated that there would be a significant positive relationship between sexual sensation seeking and sociosexuality, and for hypothesis two, which stated that there would be a significant positive relationship between sexual attitudes and sociosexuality. However, the results disconfirmed hypothesis three, which stated that there would be a significant negative relationship between personal religiosity and sociosexuality. Moreover, the results show that sexual attitudes interacted with sexual sensation seeking to predict sociosexual attitudes (β = .13, $p < .01$), sociosexual desire (β = .21, $p < .001$), and sociosexual behaviour (β = .11, $p < .05$). Personal religiosity interacted with sexual sensation seeking to predict sociosexual behaviour (β = .14, $p < .01$) but not sociosexual attitudes and sociosexual desire. The two moderation models were statistically significant, accounting for additional variance of 1% in sociosexual attitudes ($\Delta R^2 = .01$, $p < .05$), 4% in sociosexual desire ($\Delta R^2 = .04$, $p < .01$), and 2% in sociosexual behaviour ($\Delta R^2 = .02$, $p < .05$). These results support hypotheses four and five, which stated that sexual attitudes and religiosity each would moderate the relationship between sexual sensation seeking and sociosexuality.

To probe significant two-way interactive effects, we used both the *simple slopes technique* and the *Johnson-Neyman technique* (JN technique) in Hayes' PROCESS Macro (Hayes 2013). In this study, the focal predictor was sexual sensation seeking. The moderators were sexual attitudes and religiosity. Using the simple slopes technique, we estimated the effects of the focal predictor (i.e. sexual sensation seeking) at low (1 *SD* below the mean), mean (sample mean),

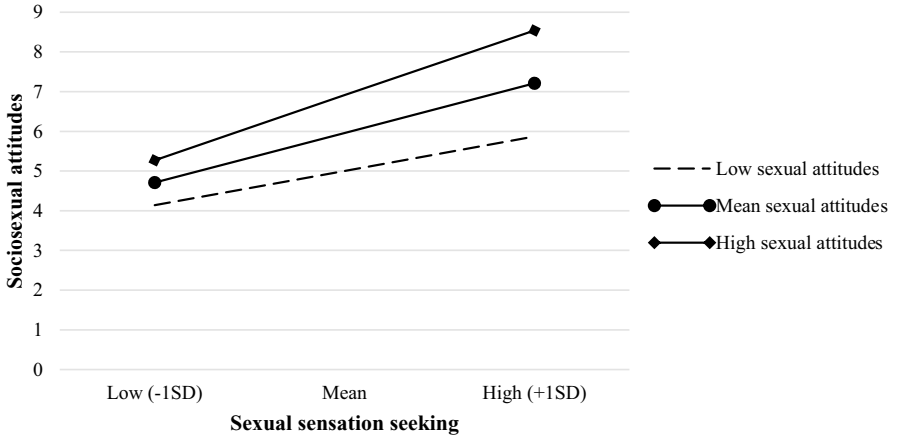

Fig. 1 Interactive effect of sexual sensation seeking and sexual attitudes on sociosexual attitudes

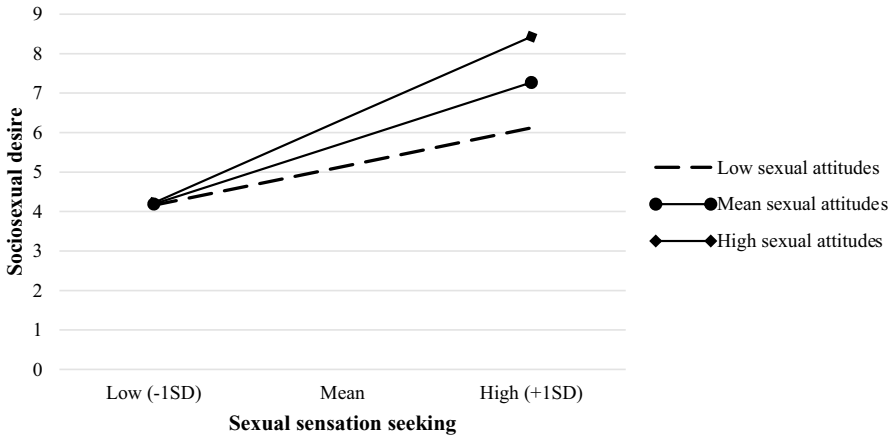

Fig. 2 Interactive effect of sexual sensation seeking and sexual attitudes on sociosexual desire

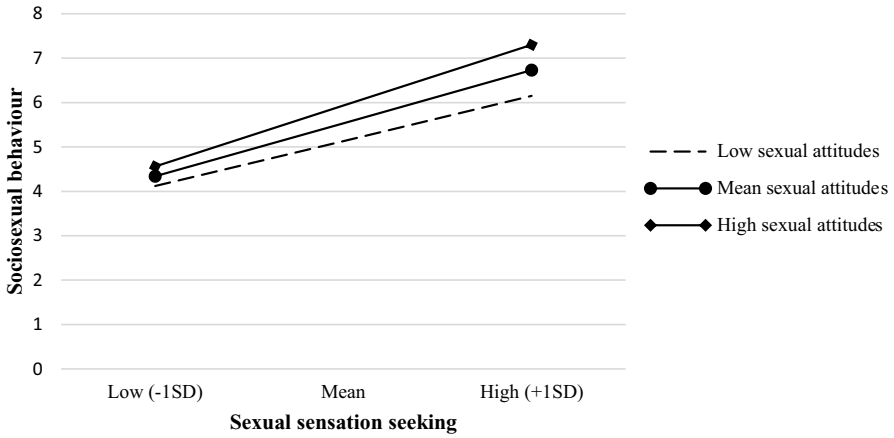

Fig. 3 Interactive effect of sexual sensation seeking and sexual attitudes on sociosexual behaviour

and high (1 *SD* above the mean) values of the moderators (i.e. sexual attitudes and religiosity). The interaction plots are illustrated in Figs. 1, 2, 3 and 4.

Due to the limitations associated with the simple slopes technique, we further probed the interaction using the Johnson–Neyman technique (JN technique) in Hayes' PROCESS Macro (Hayes 2013). The JN technique uses confidence bands to determine which values of the moderator the effect of the focal predictor on the dependent variable is significant (i.e. regions of significance). The results of the conditional effect of sexual sensation seeking (focal predictor) on sociosexual attitude, sociosexual desire, and sociosexual behaviour at values of sexual attitudes and religiosity (moderators) are presented in Table 4.

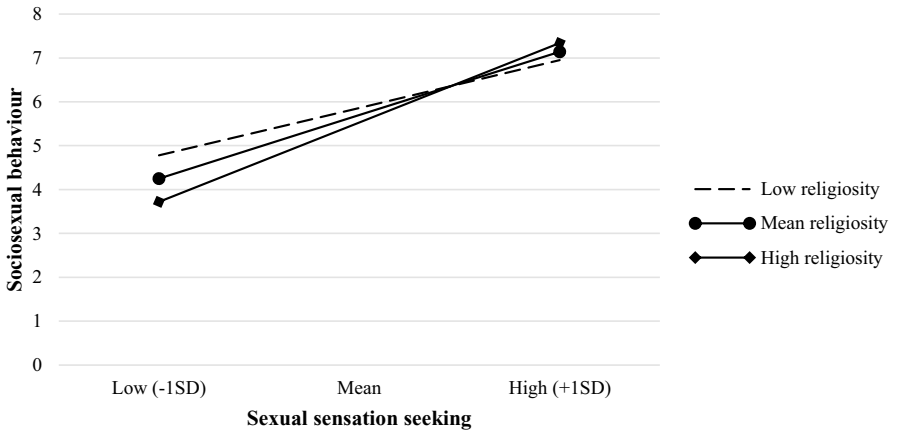

Fig. 4 Interactive effect of sexual sensation seeking and religiosity on sociosexual behaviour

Table 4 Conditional effects of sexual sensation seeking (focal predictor) on sociosexual attitudes, sociosexual desire, and sociosexual behaviour at values of sexual attitudes and religiosity (moderators)

	Sociosexual attitudes		Sociosexual desire		Sociosexual behaviour	
Sexual attitudes	*b*	95% CI	*b*	95% CI	*b*	95% CI
1 SD below mean	.098**	.036, .159	.111***	.057, .164	.115***	.067, .162
At the mean	.141***	.097, .185	.174***	.136, .212	.135***	.101, .168
1 SD above mean	.185***	.135, .234	.237***	.195, .279	.155***	.117, .193
Religiosity						
1 SD below mean					.123***	.083, .162
At the mean					.163***	.135, .192
1 SD above mean					.204***	.164, .244

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

Multivariate Analysis of Variance Results

To investigate possible differences in sociosexual attitudes, sociosexual desire, and sociosexual behaviour by gender, a one way multivariate analysis of variance (MANOVA) test was conducted. First, sociosexual attitudes, sociosexual desire, and sociosexual behaviour were entered into the equation as dependent variables, whereas gender (male vs. female) was entered as a fixed factor. Bonferroni's correction was used to probe significant multivariate results. MANOVA results revealed statistically significant differences on the composite dependent variable by gender, $F(3,311) = 20.25$, $p < .001$; Wilks' $\lambda = .84$; partial $\eta^2 = .16$. Inspection of the follow-up univariate results showed that, there were significant differences in all three dependent variables by gender. Specifically, men demonstrated more favourable sociosexual attitudes ($M = 7.18$, $SD = 3.81$) than did women ($M = 5.05$,

$SD = 2.91$); $F(1, 313) = 30.58$, $p <= .001$, partial $\eta^2 = .09$. Compared with women ($M = 4.72$, $SD = 2.74$), men showed greater sociosexual desire ($M = 7.23$, $SD = 3.36$), $F(1, 313) = 52.06$, $p <= .001$, partial $\eta^2 = .14$. In addition, compared with women ($M = 4.70$, $SD = 2.21$), men engaged in more sociosexual behaviour ($M = 6.48$, $SD = 2.81$), $F(1, 313) = 38.27$, $p <= .001$, partial $\eta^2 = .11$. These results provide support to hypothesis one, which stated that men would score higher on sociosexuality than women.

Discussion

This study has reported six main results. First, men reported a more unrestricted (i.e. higher) sociosexual attitude, sociosexual desire, and sociosexual behaviour than did women. Second, sexual attitudes were positively associated with sociosexual attitude, sociosexual desire, and sociosexual behaviour. Third (moderation hypothesis), sexual attitudes interacted with sexual sensation seeking to predict sociosexual attitude, sociosexual desire, and sociosexual behaviour. As we show in Table 4 and in Figs. 1, 2 and 3, sexual attitudes enhanced the effects of sexual sensation seeking on sociosexual attitudes, sociosexual desire, and on sociosexual behaviour, such that sexual sensation seeking was positively significant at low, medium, and high levels of sexual attitudes. Specifically, the relationship between sexual sensation seeking and sociosexuality was significantly more positive at higher levels of sexual attitudes than at lower levels of sexual attitudes. This result confirms that the relationship between sexual sensation seeking and sociosexuality is contingent on sexual attitudes. Thus, sexual risk reduction programmes should target unfavourable sexual attitudes that strengthen sexual sensation seeking.

Fourth, sexual sensation seeking was positively related to sociosexual attitude, sociosexual desire, and sociosexual behaviour. Fifth, personal religiosity was negatively associated with sociosexual attitude, sociosexual desire, and sociosexual behaviour. Sixth (moderation hypothesis), personal religiosity interacted with sexual sensation seeking to predict sociosexual behaviour but not sociosexual attitude and sociosexual desire, indicating that religiosity does not seem to override our participants' existing sociosexual attitudes and motivations. Unexpectedly, we found that in this sample the effect of sexual sensation seeking on sociosexual behaviour was positively significant at low, medium, and high levels of religiosity, with the relationship becoming much stronger at higher levels of religiosity than at lower levels of religiosity (see Fig. 4 and Table 4). These results support those reported in other research.

To begin with, the finding regarding gender differences in sociosexuality in the Ghanaian context confirms that of a previous cross-national research (Schmitt 2005). Earlier work has shown that men generally report more sexual activity, more sexual partners, and more permissive sexual attitudes than women do (Fisher 2007). In addition, a 23-year longitudinal study using a large sample ($N = 7777$) found that men exhibited more permissive sexual attitudes and demonstrated higher unrestricted sociosexuality than did women (Sprecher et al. 2013). In Ghana, Anarfi and Owusu (2011) reported that greater fidelity is valued and expected in

sexual relationships, however the social norms of fidelity expectations seemed to be lowered in favour of men. It would seem that Ghanaian sexual script enjoins men, like their counterparts elsewhere, to approach sexual activity with boldness whereas women do so with coyness in order to conform to masculinity and sex role norms. In other words, Ghanaian cultural norms of masculinity seem to expect of men to uphold a masculine sexual script. Because sexual scripts are approved cultural norms that provide guidelines for appropriate sexual behaviour for men and women to interpret and to respond to sexual situations (see e.g., Frith and Kitzinger 2001; Masters et al. 2013; Simon and Gagnon 1986), our results seem to suggest that some Ghanaian men tend to view casual, uncommitted sex as an appropriate, gender-normative sexual behaviour. This result is of major importance for HIV prevention because it indicates that some Ghanaian men embrace casual, uncommitted sex which may expose them to sexual health risks.

Similarly, the positive association between sexual sensation seeking and sociosexuality reported in this study is consistent with findings from prior research (see e.g. Zheng and Zheng 2014). That is, in the Ghanaian context, people who scored higher on sexual sensation seeking also scored higher on sociosexuality (i.e. unrestricted sociosexuality). Other prior research found higher sexual sensation seeking to relate positively to more frequent vaginal and anal sexual intercourse (Nguyen et al. 2012). In addition, Matarelli (2013) demonstrated that higher sexual sensation seeking did not only predict more frequent sexual activities but also it could increase unprotected sexual activity by about threefold. Recent research has shown that high sexual sensation seekers tend to have a higher number of lifetime sexual partners, use condoms inconsistently, and possess low self-efficacy to refuse sex (Voisin et al. 2013). From the foregoing, the current result suggests that Ghanaians higher on sexual sensation seeking would stop at nothing to engage in casual, uncommitted, multiple sexual affairs. Sensation seeking is considered a personality dimension that remains stable over time (see e.g. Aluja et al. 2002; Roberti 2004; Zuckerman 1994). This finding is an important new information for sexual risk reduction and HIV prevention programme developers and implementers in Ghana. Therefore, efforts to identify individuals high on sexual sensation seeking would be crucial to inform the design of targeted sexual risk reduction programmes.

Relatedly, in this sample sexual attitudes related positively to sociosexuality. This result finds support in previous research. It has been found that sexual behaviours such as viewing pornography are, in large part, determined by pre-existing sexual attitudes (Wright 2018). Hendrick et al. (2006) argued that sexual attitudes describe beliefs, values, and orientations to sexual activity. Sexual attitudes are said to be formed from information on sexuality available in a cultural context, including traditional and social media through the medium of socialization. Therefore, such information sources should be of interest to sexual risk reduction programme developers in Ghana. This would enable sexual health programme developers to endeavour to disseminate accurate sexual health information, and to counter inaccurate sexuality information in the public domain. It is possible that if this is done permissive sexual attitudes that bring about sociosexuality may be reduced.

Moreover, an interesting finding in this study is that personal religiosity was negatively associated with sociosexuality, consistent with our prediction. However,

this association did not reach statistical significance, contrary to findings in most previous research regarding the effect of religiosity on sexual behaviour in Ghana. Anarfi and Owusu (2011) examined three agents of sexual socialisation in Ghana (i.e. state, religion, and society) to find out which of them exerted the greatest influence on sexual expression. They found that religious practice exerted the greatest influence. However, they noted that modernity seemed to be eroding the gains made by Christianity in regulating sexual behaviour. This finding appears to confirm that of an earlier research in Ghana which reported that religious affiliation was a key determinant of premarital sexual activity (Addai 2000). Addai (2000) observed that women professing what the author calls "liberal" religious faith (i.e. Protestants and Catholics) had higher odds of engaging in premarital sexual activity, compared with women professing Traditional religions, sectarian Christianity, and Islam. Consistent with our finding, Vasilenko et al. (2013) showed that religiosity does not have a conditional effect on people's sexual desire and behaviour.

Note that the sample in this study is predominantly Christian. Correspondingly, a possible explanation for this result is that while extrinsic religiosity [i.e. "religion of comfort and social convention, a self-serving, instrumental approach shaped to suit oneself", (Donahue 1985, p. 400)] may be prevailing in Ghana, few attempts are made by religious adherents to internalise the teachings of their religious faiths [i.e. intrinsic religiosity "religion as a meaning-endowing framework in terms of which all of life is understood", (Donahue 1985, p. 400)] regarding sexual behaviour. In this study, we assessed intrinsic religiosity which is also known as personal religiosity. Besides, recent research and reports in Ghana have noted that "prosperity gospel" seems to be replacing the gospel of Jesus in most churches (Kwateng-Yeboah 2016; Robinson 2017; Tawiah 2018). Rowatt and Schmitt (2003) showed that people with extrinsic religious orientation engaged in more unrestricted sociosexuality, including partner poaching than do people with intrinsic religious orientation. For more information on Allport's concepts of intrinsic and extrinsic religiosity, see Donahue 1985). Taken together, our findings show that the relationship between sexual sensation seeking and sociosexuality is, to a large extent, contingent on sexual attitudes and religiosity. The findings thus offer additional evidence that sexual attitudes and religiosity are important for understanding sociosexuality.

Limitation of the Study

This study used a cross-sectional research design which is known to be limited in terms of data quality. It is well known that data from cross-sectional research do not offer robust insights into a phenomenon, compared with data obtained with longitudinal research designs. Therefore, we were unable to examine intra-individual differences in sociosexuality, sexual sensation seeking, and sexual attitudes over time. In addition, our sample size of 315, although sufficient, may not be considered large enough. The sample was also recruited in an urban city, Accra, the capital city of Ghana, using convenience sampling procedures. Convenience sampling techniques are held to limit a study results' generalisablity because respondents mostly participate on the basis of self-selection. Thus, the findings may not be representative of

people living in rural or peri-urban Ghana. A further limitation of the study is that we assessed sociosexuality, sexual sensation seeking, and sexual attitudes using self-report measures. Sexual behaviour is considered a sensitive topic for many. Self-report measures of sexual behaviour are known to be attended by socially desirable responding bias. We did not use specialised measures to assess and to partial out the effects of socially desirable responding in this study. The current results should be interpreted with these limitations in mind.

Conclusion

Our results suggest that some Ghanaian men seem to view casual, uncommitted sex as an appropriate sexual behaviour, consistent with prevailing masculine sexual script norms in Ghana. They also suggest that Christianity seems to be losing its regulatory influence on sexual behaviour in this cultural context. These results offer opportunities for HIV prevention and sexual risk reduction in Ghana. Indeed, findings suggest that sexual risk reduction programmes should target sexual sensation seeking and sociosexuality.

Author Contributions ETK and FK conceptualised the study. FK collected the data. ETK analysed the data and interpreted the results. ETK and FK drafted the manuscript. ETK reviewed the manuscript for critical intellectual content. Both authors read and approved the final manuscript.

Funding Not applicable.

Availability of Data and Material The data are available from the corresponding author on reasonable written request.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest to report.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Approval for this study was obtained from the Ethics Committee for the Humanities at the University of Ghana (Protocol Number: ECH045/18-19).

Informed Consent Informed consent was obtained from all individual participants included in the study.

References

Addai, I. (2000). Religious affiliation and sexual Initiation among Ghanaian women. *Review of Religious Research, 41*(3), 328–343.

Ahrold, T. K., Farmer, M., Trapnell, P. D., & Meston, C. M. (2011). The relationship among sexual attitudes, sexual fantasy, and religiosity. *Archives of Sex Behavior, 40,* 619–630. https://doi.org/10.1007/s10508-010-9621-4.

Aluja, A., Garcia, O., & Garcia, L. F. (2002). A comparative study of Zuckerman's three structural models for personality through the NEO-PI-R, ZKPQ-III-R, EPQ-RS and Goldberg's 50-bipolar adjectives. *Personality and Individual Differences, 33,* 713–726. https://doi.org/10.1016/S0191-8869(01)00186-6.

Anarfi, J. K., & Owusu, A. Y. (2011). The making of a sexual being in Ghana: The state, religion and the influence of society as agents of sexual socialization. *Sexuality and Culture, 15,* 1–18. https://doi.org/10.1007/s12119-010-9078-6.

Bassett, R. L., Smith, H. L., Newell, R. J., & Richards, A. H. (1999). Thou shalt not like sex: Taking another look a religiousness and sexual attitudes. *Journal of Psychology and Christianity, 18,* 205–216.

Benet-Martinez, V., & John, O. P. (1998). Los Cinco Grandes across cultures and ethnic groups: Multitrait-multi-method analyses of the Big Five in Spanish and English. *Journal of Personality and Social Psychology, 75*(3), 729–750. https://doi.org/10.1037//0022-3514.75.3.729.

Bogaert, A. F., Ashton, M. C., & Lee, K. (2018). Personality and sexual orientation: Extension to asexuality and the HEXACO model. *The Journal of Sex Research, 55*(8), 951–961. https://doi.org/10.1080/00224499.2017.1287844.

Bourdage, J. S., Lee, K., Ashton, M. C., & Perry, A. (2007). Big Five and HEXACO model personality correlates of sexuality. *Personality and Individual Differences, 43,* 1506–1516. https://doi.org/10.1016/j.paid.2007.04.008.

Brelsford, G. M., Luquis, R., & Murray-Swank, N. A. (2011). College students' permissive sexual attitudes: Links to religiousness and spirituality. *International Journal for the Psychology of Religion, 21*(2), 127–136. https://doi.org/10.1080/10508619.2011.557005.

Brown, M., Sacco, D. F., & Medlin, M. M. (2019). Sociosexual attitudes differentially predict men and women's preferences for agreeable male faces. *Personality and Individual Differences, 141,* 248–251. https://doi.org/10.1016/j.paid.2019.01.027.

Cain, M. K., Zhang, Z., & Yuan, K.-H. (2017). Univariate and multivariate skewness and kurtosis for measuring nonnormality: Prevalence, influence and estimation. *Behavior Research Methods, 49,* 1716–1735. https://doi.org/10.3758/s13428-016-0814-1.

Cleveland, M. J., Testa, M., & Hone, L. S. E. (2019). Examining the roles of heavy episodic drinking, drinking venues, and sociosexuality in college men's sexual aggression. *Journal of Studies on Alcohol and Drugs, 80*(2), 177–185. https://doi.org/10.15288/jsad.2019.80.177.

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Mahwah: Lawrence Erlbaum Associates Publishers.

Donahue, M. J. (1985). Intrinsic and extrinsic religiousness: Review and meta-analysis. *Journal of Personality and Social Psychology, 48*(2), 400–419. https://doi.org/10.1037/0022-3514.48.2.400.

Field, A. (2009). *Discovering statistics using SPSS* (3rd ed.). London: SAGE publications.

Fisher, T. D. (2007). Sex of experimenter and social norm effects on reports of sexual behavior in young men and women. *Archives of Sexual Behaviour, 36,* 89–100. https://doi.org/10.1007/s10508-006-9094-7.

Frith, H., & Kitzinger, C. (2001). Reformulating sexual script theory: Developing a discursive psychology of sexual negotiation. *Theory & Psychology, 11,* 209–232. https://doi.org/10.1177/0959354301112004.

Gaither, G. A., & Sellbom, M. (2003). The sexual sensation seeking scale: Reliability and validity within a heterosexual college student sample. *Journal of Personality Assessment, 81*(2), 157–167. https://doi.org/10.1207/s15327752jpa8102_07.

Gettler, L. T., Kuo, P. X., Rosenbaum, S., Avila, J. L., McDade, T. W., & Kuzawa, C. W. (2019). Sociosexuality, testosterone, and life history status: Prospective associations and longitudinal changes among men in Cebu, Philippines. *Evolution and Human Behavior, 40*(2), 249–258. https://doi.org/10.1016/j.evolhumbehav.2018.11.001.

Ghana Statistical Service. (2012). *2010 Population & housing census: Summary report of final results*. Retrieved January 8, 2020 from https://www.statsghana.gov.gh/gssmain/storage/img/marqueeupdater/Census2010_Summary_report_of_final_results.pdf.

Gil-Llario, M. D., Morell-Mengual, V., Ballester-Arnal, R., Giménez-García, C., & Castro-Calvo, J. (2015). Sexual sensation seeking in Spanish young men and women with different sexual orientations. *Journal of Sex and Marital Therapy, 41*(5), 525–530. https://doi.org/10.1080/009262 3x.2014.931316.

Hall, N. M. (2012). Sociosexuality, human immunodeficiency virus (HIV) susceptibility, and sexual behaviour among African American women. *Journal of AIDS and HIV Research, 5*(2), 43–51. https://doi.org/10.5897/JAHR12.049.

Hall, N. M., & Pichon, L. C. (2014). Gender roles, sociosexuality, and sexual behaviour among US Black women. *Health Psychology & Behavioural Medicine, 2*(1), 171–182. https://doi.org/10.1080/21642850.2014.882236.

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York, NY: Guilford Press.

Heaton, T., James, S., & Oheneba-Sakyi, Y. (2009). Religion and socioeconomic attainment in Ghana. *Review of Religious Research, 51*(1), 71–86.

Hendrick, C., Hendrick, S. S., & Reich, D. A. (2006). Brief sexual attitudes scale. *Journal of Sex Research, 43,* 76–86. https://doi.org/10.1080/00224490609552301.

Holtzman, N. S., & Strube, M. J. (2013). Above and beyond short-term mating, long-term mating is uniquely tied to human personality. *Evolutionary Psychology, 11*(5), 1101–1129. https://doi.org/10.1177/147470491301100514.

John, O. P., Naumann, L. P., & Soto, C. J. (2008). Paradigm shift to the integrative Big-Five trait taxonomy: History, measurement, and conceptual Issues. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (pp. 114–158). New York, NY: Guilford Press.

Joseph, S., & DiDuca, D. (2007). The Dimensions of Religiosity Scale: 20-item self-report measure of religious preoccupation, guidance, conviction, and emotional involvement. *Mental Health, Religion and Culture, 10*(6), 603–608. https://doi.org/10.1080/13674670601050295.

Kalichman, S. C., Johnson, J. R., Adair, V., Rompa, D., Multhauf, K., & Kelly, J. A. (1994). Sexual sensation seeking: Scale development and predicting AIDS-risk behavior among homosexually active men. *Journal of Personality Assessment, 62*(3), 385–397. https://doi.org/10.1207/s15327752jpa6203_1.

Kalichman, S. C., & Rompa, D. (1995). Sexual sensation seeking and sexual compulsivity scales: Validity, and predicting HIV risk behavior. *Journal of Personality Assessment, 65,* 586–601. https://doi.org/10.1207/s15327752jpa6503_16.

Kwateng-Yeboah, J. (2016). *'I wish you prosperity!': Analysing the social effect of the prosperity gospel on poverty alleviation in neo-pentecostal Accra, Ghana* (master's thesis). University of Oslo. Retrieved from https://www.duo.uio.no/bitstream/handle/10852/51218/James-Thesis-Final.pdf?sequence=1&isAllowed=y.

Markey, P., & Markey, C. (2013). Sociosexuality and relationship commitment among lesbian couples. *Journal of Research in Personality, 47,* 282–285. https://doi.org/10.1016/j.jrp.2013.02.002.

Masters, N. T., Casey, E., Wells, E. A., & Morrison, D. M. (2013). Sexual scripts among young heterosexually active men and women: Continuity and change. *Journal of Sex Research, 50,* 409–420. https://doi.org/10.1080/00224499.2012.661102.

Matarelli, S. A. (2013). Sexual sensation seeking and Internet sex-seeking of Middle Eastern men who have sex with men. *Archives of Sexual Behavior, 42*(7), 1285–1297. https://doi.org/10.1007/s10508-013-0073-5.

Moussa, S. (2016). A comment on the estimation of the reliability of multidimensional marketing constructs: A store personality scale application. *Global Business Review, 17*(5), 1125–1144. https://doi.org/10.1177/0972150916656668.

Nascimento, B. S., Hanel, P. P. H., Monteiro, R. P., Gouveia, V. V., & Little, A. C. (2018). Sociosexuality in Brazil: Validation of the SOI-R and its correlates with personality, self-perceived mate value, and ideal partner preferences. *Personality and Individual Differences, 124,* 98–104. https://doi.org/10.1016/j.paid.2017.12.007.

Neto, F. (2015). Revisiting correlates of sociosexuality for men and women: The role of love relationships and psychological maladjustment. *Personality and Individual Differences, 83,* 106–110. https://doi.org/10.1016/j.paid.2015.03.033.

Nguyen, H. V., Koo, K. H., Davis, K. C., Otto, J. M., Hendershot, C. S., Schacht, R. L., et al. (2012). Risky sex: Interactions among ethnicity, sexual sensation seeking, sexual inhibition, and sexual excitation. *Archives of Sexual Behavior, 41*(5), 1231–1239. https://doi.org/10.1007/s10508-012-9904-z.

Oliver, M. B., & Hyde, J. S. (1993). Gender differences in sexuality: A meta-analysis. *Psychological Bulletin, 114*(1), 29–51. https://doi.org/10.1037/0033-2909.114.1.29.

Penke, L., & Asendorpf, J. B. (2008). Beyond global sociosexual orientations: A more differentiated look at sociosexuality and its effects on courtship and romantic

relationships. *Journal of Personality and Social Psychology, 95*(5), 1113–1135. https://doi.org/10.1037/0022-3514.95.5.1113.

Peters, J. R., Eisenlohr-Moul, T. A., Pond, R. S., Jr., & DeWall, C. N. (2014). The downside of being sexually restricted: The effects of sociosexual orientation on relationships between jealousy, rejection, and anger. *Journal of Research in Personality, 51,* 18–22. https://doi.org/10.1016/j.jrp.2014.04.002.

Petersen, J. L., & Hyde, J. S. (2010). A meta-analytic review of research on gender differences in sexuality, 1993–2007. *Psychological Bulletin, 136*(1), 21–38. https://doi.org/10.1037/a0017504.

Petersen, J. L., & Hyde, J. S. (2011). Gender differences in sexual attitudes and behaviours: A review of meta-analytic results and large datasets. *Journal of Sex Research, 48*(2–3), 149–165. https://doi.org/10.1080/00224499.2011.551851.

Roberti, J. W. (2004). A review of behavioral and biological correlates of sensation seeking. *Journal of Research in Personality, 38,* 256–279. https://doi.org/10.1016/S0092-6566(03)00067-9.

Robinson, D. (2017). Succeed here and in eternity: The prosperity gospel in Ghana. *Irish Theological Quarterly, 82,* 2. https://doi.org/10.1177/0021140017695699e.

Rowatt, W. C., & Schmitt, D. P. (2003). Associations between religious orientation and varieties of sexual experience. *Journal for the Scientific Study of Religion, 42*(3), 455–465. https://doi.org/10.1111/1468-5906.00194.

Schmitt, D. P. (2005). Sociosexuality from Argentina to Zimbabwe: A 48-nation study of sex, culture, and strategies of human mating. *Behavioral and Brain Sciences, 28,* 247–311. https://doi.org/10.1017/s0140525x05000051.

Schmitt, D. P., & Fuller, R. C. (2015). On the varieties of sexual experience: Cross-cultural links between religiosity and human mating strategies. *Psychology of Religion and Spirituality, 7*(4), 314–326. https://doi.org/10.1037/rel0000036.

Schmitt, D. P., & Shackelford, T. K. (2008). Big five traits related to short-term mating: From personality to promiscuity across 46 nations. *Evolutionary Psychology, 6,* 246–282. https://doi.org/10.1177/147470490800600204.

Simon, W., & Gagnon, J. H. (1986). Sexual scripts: Permanence and change. *Archives of Sexual Behaviour, 15,* 97–120. https://doi.org/10.1007/BF01542219.

Simpson, J. A., & Gangestad, S. W. (1991). Individual differences in sociosexuality: Evidence for convergent and discriminant validity. *Journal of Personality and Social Psychology, 60,* 870–883. https://doi.org/10.1037//0022-3514.60.6.870.

Simpson, J. A., & Gangestad, S. W. (1992). Sociosexuality and romantic partner choice. *Journal of Personality, 60*(1), 31–51. https://doi.org/10.1111/j.1467-6494.1992.tb00264.x.

Simpson, J. A., Wilson, C. L., & Winterheld, H. A. (2004). Sociosexuality and romantic relationships. In J. H. Harvey, A. Wenzel, & S. Sprecher (Eds.), *Handbook of sexuality in close relationships* (pp. 87–111). Mahwah, NJ: Erlbaum.

Spitalnick, J., DiClemente, R., Wingood, G., Crosby, R. A., Milhausen, R. R., Sales, J. M., et al. (2007). Brief report: Sexual sensation seeking and its relationship to risky sexual behaviour among African-American adolescent females. *Journal of Adolescence, 30*(1), 165–173. https://doi.org/10.1016/j.adolescence.2006.10.002.

Sprecher, S., Treger, S., & Sakaluk, J. K. (2013). Premarital sexual standards and sociosexuality: Gender, ethnicity, and cohort differences. *Archives of Sexual Behavior*. https://doi.org/10.1007/s10508-013-0145-6.

Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics* (6th ed.). Boston, MA: Pearson.

Tawiah, O. (2018). 'Prosperity gospel' leading many astray—Ministers caution. *Myjoyonline*. Retrieved from https://www.myjoyonline.com/news/2018/April-22nd/prosperity-gospel-leading-many-astray-ministers-caution.php.

Testa, M., & Hone, L. S. E. (2019). Sociosexuality predicts drinking frequency among first-year college women. *Psychology of Addictive Behaviors, 33*(7), 644–648. https://doi.org/10.1037/adb0000507.

Treger, S., & Sprecher, S. (2011). The influences of sociosexuality and attachment style on reactions to emotional versus sexual infidelity. *The Journal of Sex Research, 48*(5), 413–422. https://doi.org/10.1080/00224499.2010.516845.

Trinitapoli, J., & Regnerus, M. D. (2006). Religion and HIV risk behaviors among married men: Initial results from a study in rural Sub-Saharan Africa. *Journal for the Scientific Study of Religion, 45*(4), 505–528. https://doi.org/10.1111/j.1468-5906.2006.00325.x.

Vasilenko, S. A., Duntzee, C. I., Zheng, Y., & Lefkowitz, E. S. (2013). Testing two process models of religiosity and sexual behaviour. *Journal of Adolescence, 36*(667–673), x. https://doi.org/10.1016/j.adolescence.2013.04.002.

Voisin, D. R., Tan, K., & DiClemente, R. J. (2013). A longitudinal examination of the relationship between sexual sensation seeking and STI-related risk factors among African American females. *AIDS Education and Prevention, 25*(2), 124–134. https://doi.org/10.1521/aeap.2013.25.2.124.

Webster, G. D., Laurenceau, J.-P., Smith, C. V., Mahaffey, A. L., Bryan, A. D., & Brunell, A. B. (2015). An investment model of sociosexuality, relationship satisfaction, and commitment: Evidence from dating, engaged, and newlywed couples. *Journal of Research in Personality, 55,* 112–126. https://doi.org/10.1016/j.jrp.2015.02.004.

Wongsomboon, V., Burleson, M. H., & Webster, G. D. (2020). Women's orgasm and sexual satisfaction in committed sex and casual sex: Relationship between sociosexuality and sexual outcomes in different sexual contexts. *The Journal of Sex Research, 57*(3), 285–295. https://doi.org/10.1080/00224499.2019.1672036.

Wright, P. J. (2018). Pornography and sexual behaviour: Do sexual attitudes mediate or confound? *Communication Research*. https://doi.org/10.1177/0093650218796363.

Yost, M. R., & Zurbriggen, E. L. (2006). Gender differences in the enactment of sociosexuality: An examination of implicit social motives, sexual fantasies, coercive sexual attitudes, and aggressive sexual behavior. *Journal of Sex Research, 43*(2), 163–173. https://doi.org/10.1080/00224490609552311.

Zheng, L., & Zheng, Y. (2014). Online sexual activity in Mainland China: Relationship to sexual sensation seeking and sociosexuality. *Computers in Human Behavior, 36,* 323–329. https://doi.org/10.1016/j.chb.2014.03.062.

Zuckerman, M. (1994). *Behavioral expressions and biosocial bases of sensation seeking*. New York: Cambridge Press.

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