

Social capital and sexual behavior among Ugandan university students

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Background: Uganda has reduced its prevalence of HIV/AIDS from 18 to 6.5% within a decade. An important factor behind this might have been the response from faith-based voluntary organizations, which developed social capital for achieving this. Three behaviors have been targeted: Abstinence, Being faithful, and Condom use (the ABC strategy). The aim of this study was to explore the association between social capital and the ABC behaviors, especially with reference to religious factors.

Methods: In 2005, 980 Ugandan university students responded to a self-administered questionnaire (response rate 80%). It assessed sociodemographic factors, social capital, importance of religion, sexual debut, number of lifetime sexual partners, and condom use. Logistic regression analysis was applied as the main analytical tool.

Results: Thirty-seven percent of the male and 49% of the female students had not had sexual intercourse. Of those with sexual experience, 46% of the males and 23% of the females had had three or more lifetime sexual partners, and 32% of those males and 38% of the females stated they did not always use condoms with a new partner. Low trust in others was associated with a higher risk for not always using condoms with a new partner among male students (OR 1.7, 95% CI 1.1–2.8), and with a lower risk for sexual debut among female students (OR 0.5, 95% CI 0.3–0.9). Non-dominant bridging trust among male students was associated with a higher risk for having had many sexual partners (OR 1.8, 95% CI 1.2–2.9). However, low trust in others was associated with a greater likelihood of sexual debut in men, while the opposite was true in women, and a similar pattern was also seen regarding a high number of lifetime sexual partners in individuals who were raised in families where religion played a major role.

Conclusions: In general, social capital was associated with less risky sexual behavior in our sample. However, gender and role of religion modified the effect so that we can not assume that risky sexual behavior is automatically reduced by increasing social capital in a highly religious society. The findings indicate the importance of understanding the interplay between social capital, religious influence, and gender issues in HIV/AIDS preventive strategies in Uganda.

Keywords: *youth; sexual behavior; sexual health; HIV/AIDS; gender; social capital; religion; Uganda*

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Uganda is widely regarded as a country that has been successful in achieving a substantial decline in the prevalence of HIV (1). It was the first country in the world to introduce a multisectoral response to HIV/AIDS, including the development of policies, strategies, and programs that focus on the ABC factors of Abstinence, Be faithful, and Condom use (2). The

political leadership of Uganda responded promptly to the alarming epidemiological prevalence of HIV and the incidence in the country by making an early commitment to fight the epidemic. Religious leaders and religious organizations were also involved from the outset (3). In a recent analysis of possible factors behind Uganda's success in lowering the burden of HIV/AIDS, Muriisa has highlighted the response to the epidemic by the voluntary sector (4). The author suggests that such groups, most of which are faith-based in Uganda, played

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a major role by effectively using or building social capital in the local community as a means of supporting individuals who had become HIV-positive or were at risk thereof. The reason for this development, according to Muriisa, was the apparent lack of capacity in the public health care system of Uganda to deal with the emerging epidemic, both in terms of general resources and preparedness to take leadership in a change process. Individuals and families afflicted by HIV/AIDS then formed voluntary groups like TASO (The AIDS Support Organization), which complemented the strong initiative from the top leadership of the nation in developing support services more appropriate to the new situation. Similar suggestions regarding the mobilization of social capital though the voluntary sector have been put forward to explain the decline in the prevalence of HIV/AIDS in the neighboring Kagera region of Tanzania (5).

Social capital was brought into the discussion of population health by Robert Putnam's often cited work on social capital and sociopolitical development in Italy (6). The concept of social cohesion was introduced by Wilkinson (7) in order to explain why more egalitarian societies tended to have a higher life expectancy, even when taking into account an array of other important determinants of health. This paved the way for incorporating the concept of social capital into social epidemiology, basically as an equivalent to the notion of social cohesion. Social capital is most commonly operationalized as trust in others (8), participation (9), and shared values. These three aspects of social capital are theoretically strongly interrelated so that social participation leads to an increased set of shared values among those who participate together (i.e. in religious or other contexts), which in turn enhances trust among those individuals or in society in general if participation is widespread in different arenas. A distinction is often made between *bonding* social capital (referring to relations between individuals in the family or between those sharing similar sociodemographic characteristics), as opposed to *bridging* social capital (relations between individuals with different background).

Each type of social capital mentioned could potentially have different health impacts. Good bonding social capital has primarily been linked to better mental health and less stress-related health conditions in individuals (10, 11) while bridging social capital, as well as being linked to greater mental health. It has also been positively associated with better health-related behaviors in many studies (12). Suggested mechanisms between social capital and health range from stress-buffering effects and better access to essential health-related resources through social links to behavior modification through information or values shared by means of social participation (13, 14).

Results from several investigations have shown positive associations between social participation and sexual

health behavior (15–18). A study of 15- to 19-year-old girls in the United States found that teenage pregnancy was negatively associated with social capital (19). On the other hand, research targeting adolescents living in Cape Town, South Africa concluded that participation in social clubs and community groups was associated with less risky sexual behavior (20). The authors of another US study (21) suggested that low social capital, as measured by Putnam's Comprehensive Social Capital Index (22), was strongly associated with the risk of being infected by chlamydia and AIDS. Campbell, Williams, and Gilgen found that young South African men and women belonging to sports clubs were less likely to be HIV-positive. Moreover, young women who were members of such organizations were more likely to use condoms in comparison to non-members; female members, however, were also more likely to have casual partners (23).

Religion, particularly Christianity, has long played a major role in Uganda as a determinant of social belonging and individual moral values. It has also shaped the sociopolitical organization of the country (24). Christianity, today the religion of about 85% of Uganda's population, was largely introduced by British (Protestant) and other European missionaries during the second part of the 19th century. In recent decades, a number of charismatic churches have been established, often by North American evangelical groups or individuals. They have recruited their followers from the 'old' churches; that is, mainstream Protestant and Catholic churches and especially from the ranks of the young. These denominations, particularly the mainstream Protestant church in Uganda, have reacted by launching a revival within their organizations that places a new emphasis on being 'saved' or 'new-born' (24). The activities of some of the newly established churches have become increasingly visible at Ugandan universities and now constitute a significant part of student social life. These groups all advocate a very strict sexual moral code including no premarital sex (i.e. abstinence) and monogamy in later life (i.e. faithfulness or limited sexual partners) (25).

When it comes to encouraging condom use, the churches' stance is less clear. There is a fear that unconditionally advocating the use of condoms might counteract principles of abstinence and faithfulness. The religious uncertainty about condom use may affect the liberal atmosphere prevailing in Uganda on sexual matters and the increased struggle for gender equality, both prominent features of the early intervention strategies against HIV/AIDS. Thus, social capital and religious norms, both of which might exert significant effects on sexual behaviors among young individuals in Uganda, seem considerably intertwined. To the best of our knowledge few empirical studies have addressed these important issues. The aim of the present investigation

was to explore the association between social capital and risky sexual behavior among Ugandan university students with special reference to religious influence.

Methods

Population and setting

The study was performed at Mbarara University of Science and Technology (MUST), a public university in the city of Mbarara in southwestern Uganda. Our target population consisted of undergraduate students from the university's three faculties of medicine, science, and development studies. The sample comprised 1,220 students, the entire undergraduate class of the university in 2005.

The HIV prevalence in the Mbarara District was approximately 24% in 1991. By 2001 the prevalence had declined to 10.8%. There are several possible reasons why the HIV epidemic affected southwestern Uganda more than the rest of the country (4). Because it is a border region, sociopolitical developments have impacted the population in specific ways. During the regime of Idi Amin in the 1970s, the cross-border traffic between southwestern Uganda, Tanzania, and Rwanda increased, altering the local economy. One result was that many women resorted to prostitution as a means of earning money from the transport workers who spent the night near the border. Once the HIV epidemic had established itself, there was a sharp increase in mortality among young adults. In addition, the prevailing custom that required widows (who may have already been HIV-positive) to marry their husband's brother or closest kinsman may have further accelerated the spread of the infection (4).

Data collection

Data was collected by means of an 11-page, self-administered questionnaire consisting of 132 questions that was distributed in lecture halls to all undergraduate students at MUST. Students were orally informed beforehand about the purpose of the questionnaire and were given instructions for filling it out. A consent form on the front page also contained a written explanation and justification of the project to be signed by the students as acknowledgment of being informed and agreeing to participate. Contact details for the principal investigator and a research assistant were provided, in case any questions or personal concerns would arise while answering the questions. While students were engaged in filling out the questionnaires, the research staff ensured that the room was silent so that each person could work in private. The consent forms and the questionnaires (without identifying information) were collected separately and placed in different boxes in the front of the rooms. A total of 980 students completed the questionnaires

representing 80% of the undergraduate students at the university.

The questionnaire included assessments of lifestyle factors including alcohol consumption, drug use, and smoking habits; relationships, love, and sexuality; social relations, participation, and social capital; self-rated health; and social and demographic factors, such as area of origin, socioeconomic status (SES), religious affiliation, and the role of religion in one's family.

The research project was approved by the Institutional Ethical Review Committee at Mbarara University of Science and Technology.

Definition of variables

Background variables

Area of origin was categorized as 'rural,' 'urban,' or 'peri-urban or small town.' The variable was dichotomized into 'rural' and 'urban/peri-urban or small town.'

Educational level of head of household during childhood was categorized as 'did not finish primary school,' 'completed primary school,' 'completed secondary school,' 'post-secondary school,' 'college or university,' or 'other.' The variable was dichotomized so that 'did not finish primary school' and 'completed primary school' were coded as 'low' and any education above that was classified as 'high.'

The role of religion in the family while growing up was categorized as 'religion played a big role,' 'religion was relatively important,' 'religion was not so important,' and 'religion was not important at all.' The variable was dichotomized with 'religion played a big role' and 'religion was relatively important' coded as 'major role,' and 'religion was not so important' and 'religion was not important at all' coded as 'minor role.'

Age was divided arbitrarily into two groups at the upper tertile: 'younger' ≤ 23 years old and 'older' > 23 years old.

Sex was classified as male or female.

Social capital variables

As indicators of social capital, we selected variables indicating trust in others and social participation. Each general aspect of social capital may be divided into bonding and bridging aspects. A particular individual could, in principle, have a high or low level of these two types of social capital with one type independent of the other. In this study we focused on whether the bridging aspect of trust was dominant over the bonding aspect, rather than concentrating on the level of bridging trust. We regarded these aspects of social capital as particularly relevant for analyzing the implications of whether or not people belonged to close-knit networks based on their religious beliefs.

Trust in others was measured on the basis of answers to four questions commonly used in epidemiological

studies (8): ‘Most people would take advantage of you if they had an opportunity,’ ‘Most people try to be fair,’ ‘You can trust most people,’ and ‘You cannot be careful enough when dealing with other people.’ The response alternatives were ‘I do not agree at all,’ ‘I do not agree,’ ‘I agree,’ or ‘I agree completely’ and were accordingly assigned values from 1 to 4, yielding a maximum total score of 16. Based on the median score, the variable was dichotomized into ‘high trust’ (above the median) or ‘low trust’ (below the median).

Bridging trust was measured by five response alternatives: ‘I only trust persons with the same background as my own,’ ‘I trust persons with the same background as my own rather more than others,’ ‘I trust persons with the same background as my own a bit more than others,’ ‘I trust persons with the same background as myself equally as much as others,’ and ‘I trust persons with the same background as myself less than others.’ The variable was then dichotomized with the first three alternatives being coded as ‘non-dominant bridging trust’ and the last two alternatives as ‘dominant bridging trust.’

Social participation was classified on the basis of participation in 12 different social activities in recent months, a measure introduced by Statistics Sweden in the 1970s that has since been scientifically validated (26). Based on the median, the total scores of those who answered ‘yes’ (maximum total score 12) were dichotomized into ‘high’ (above the median) and ‘low’ (below the median).

Sexual behavior variables

Previously had sex was coded as ‘yes’ or ‘no’ based on the answer to the question: ‘Have you ever had sexual intercourse?’

Number of lifetime sexual partners was ascertained by the response to ‘How many sexual partners have you had altogether?’ The variable was dichotomized so that ≥ 3 was coded as ‘high’ and < 3 as ‘low.’

Condom use with new partner was determined by asking ‘How often do you use a condom with a new sexual partner?’ The response alternatives were ‘always,’ ‘often,’ ‘sometimes,’ or ‘never.’ They were dichotomized by classifying the first alternative as ‘always used condoms’ and the remaining three as ‘did not always use a condom.’

Analysis

Sample size was given since we assessed all the students at the university, but a formal check revealed that in most analyses a 75% increase of risk could be ascertained at 80% probability. This could not exclude the risk of not being able to detect some true effects of moderate size.

The statistical analyses were done with SPSS Version 16.0. Logistic regressions were performed to calculate the crude odds ratios (OR) with 95% confidence intervals

(CI) for the effect of background and social capital factors on ‘previously had sex,’ ‘number of lifetime sexual partners,’ and ‘condom use with new partner.’

Multivariate logistic regression (OR with 95% CI) was used to investigate the association between social capital and sexual behavior, stepwise adjusted for age, gender, rural origin, and role of religion.

Effect modification between variables was calculated by means of dummy variables as proposed by Rothman (27). According to Rothman, a synergistic effect is present when a dependent variable has a greater impact on an outcome in the presence or absence of a third variable (i.e. the association becomes ‘more than additive’).

Results

A total of 980 students responded to the questionnaire, representing 80% of all registered undergraduate students ($n = 1,220$). Thirty-five percent of the respondents were female ($n = 347$) and 65% were male ($n = 633$).

Table 1 shows the distribution of sociodemographic, social capital, and sexual behavioral outcome variables (‘having previously had sexual intercourse,’ ‘number of lifetime sexual partners,’ and ‘always condom use’). About one-third of the students were older than 23 years of age, with the female students being somewhat younger than the males. Among the male students, 50.6% came from rural areas; the corresponding percentage among females was 31.0%. A large majority of the total student population (74.5%) came from families in which the head of household had achieved a high educational level (secondary school or above). In our study, 53.8% of the males and 59.8% of the females reported that religion played a major role in their family of origin.

Low trust in others was reported by a similar proportion of males and females (39.2 and 40.2%, respectively). A larger proportion of males than females reported low social participation (55.3 and 47.6%, respectively). About half of the students reported non-dominant bridging trust, with the proportions similar among males and females. A significantly larger proportion of males than females reported having previously had sexual intercourse (62.9 and 51.3%, respectively). In the group of those who indicated that they had previously had sex, 45.9% of the males and 23.1% of the females reported having had three or more partners. A smaller proportion of males (31.5%) than females (37.8%) stated that they do not always use a condom with a new partner.

Table 2a–c provides an analysis of the associations between sociodemographic factors and social capital in relation to sexual behavior. Females were 40% less likely to have previously had sex compared with males (OR 0.6, 95% CI 0.5–0.8). Increasing age, as might be expected, also had a significant association with previously having had sex so that the likelihood of sexual debut was twice as

Table 1. Prevalence of sociodemographic factors, social capital, and sexual behavior among university students in Uganda

	All		Male		Female		χ^2
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>P</i>
Sex							
Male	633	64.6					
Female	347	35.4					
Age							
Younger ≤ 23	628	65.6	378	60.6	250	75.1	<0.001
Older >23	329	34.4	246	39.4	83	24.9	
Missing	(23)		(9)		(14)		
Area of origin							
Rural	424	43.7	318	50.6	106	31.0	<0.001
Urban/peri-urban	546	56.3	310	49.4	236	69.0	
Missing	(10)		(5)		(5)		
Educational level of head of household							
\leq Primary	235	25.5	186	31.0	49	15.2	
> Primary school	688	74.5	414	69.0	274	84.8	0.001
Missing	(57)		(33)		(24)		
Importance of religion							
Major role	542	55.9	337	53.8	205	59.8	0.080
Minor role	427	44.1	289	46.2	138	40.2	
Missing	(11)		(7)		(4)		
Trust in others							
High	544	60.2	196	60.8	348	59.8	n.s.
Low	360	39.8	126	39.2	234	40.2	
Missing	(76)						
Social participation							
High	487	49.7	155	44.7	332	52.4	n.s.
Low	493	50.3	192	55.3	301	47.6	
Missing	(0)		(51)		(25)		
Bridging trust							
Dominant	426	52	156	50.6	270	46.7	n.s.
Non-dominant	461	48	152	49.4	309	53.3	
Missing	(93)		(54)		(39)		
Previously had sex							
Yes	532	59.0	376	62.9	156	51.3	0.001
No	370	41.0	222	37.1	148	48.7	
Missing	(78)		(35)		(43)		
Number of lifetime sexual partners ^a							
1–2 = low	293	61.0	180	54.1	113	76.9	<0.001
≥ 3 = high	187	39.0	153	45.9	34	23.1	
Missing	(52)		(43)		(9)		
Condom use with a new partner ^a							
Always	324	66.7	235	68.5	89	62.2	0.21
Not always	162	33.3	108	31.5	54	37.8	
Missing	(46)		(33)		(13)		

^aOnly analyzed among individuals who had had sexual intercourse.

high among older students (OR 2.1, 95% CI 1.6–2.8), the figures were similar for males and females. The educational level of the head of household did not seem to affect the variable ‘previously had sexual intercourse’ among

those students studied. However, rural origin had a statistically significant association with having previously had sexual intercourse among male students, increasing the probability by 50% (OR 1.5, 95% CI 1.1–2.1), but this

Table 2a. Association (odds ratios, 95% confidence intervals) between sociodemographic factors, social capital, and 'previously had sex' among university students in Uganda

	Previously had sex		
	All	Female	Male
Sociodemographic background factors	Odds ratios (95% CI)	Odds ratios (95% CI)	Odds ratios (95% CI)
Sex			
Male	1 (ref.)		
Female	0.6 (0.5–0.8)		
Age			
Younger	1 (ref.)	1 (ref.)	1 (ref.)
Older	2.1 (1.6–2.8)	2.2 (1.3–3.8)	1.9 (1.3–2.7)
Area of origin			
Urban/peri-urban	1 (ref.)	1 (ref.)	1 (ref.)
Small town			
Rural	1.5 (1.1–1.9)	1.1 (0.7–1.9)	1.5 (1.1–2.1)
Educational level of head of household			
High	1 (ref.)	1 (ref.)	1 (ref.)
Low	1.0 (0.8–1.4)	0.9 (0.6–1.3)	1.1 (0.6–2.2)
Role of religion			
Major role	1 (ref.)	1 (ref.)	1 (ref.)
Minor role	1.2 (0.96–1.6)	1.0 (0.6–1.5)	1.4 (0.98–1.9)
Trust in others			
High	1 (ref.)	1 (ref.)	1 (ref.)
Low	1.0 (0.7–1.3)	0.5 (0.3–0.9)	1.3 (0.9–1.9)
Social participation			
High	1 (ref.)	1 (ref.)	1 (ref.)
Low	0.9 (0.7–1.1)	0.7 (0.5–1.2)	1.0 (0.7–1.4)
Bridging trust			
Dominant	1 (ref.)	1 (ref.)	1 (ref.)
Non-dominant	1.1 (0.9–1.5)	1.2 (0.7–2.0)	1.1 (0.8–1.6)

was not the case for female students (OR 1.1, 95% CI 0.7–1.9). Finally, a 40% greater proportion of males than females in the group stating that religion played a minor role in their families had previously had sexual intercourse (OR 1.4, 95% CI 0.98–1.9).

Regarding social capital variables, among female students low trust in others was related in a statistically significant degree to a 50% lower probability of having had previous sexual experience (OR 0.5, 95% CI 0.3–0.9), while the tendency was in the opposite direction (30% higher probability) for male students, although not statistically significant (OR 1.3, 95% CI 0.9–1.9). The other social capital factors showed no strong association with previous sexual experience.

Female students also had a 60% lower risk of having had a high number of sexual partners, compared with the males (OR 0.4, 95% CI 0.2–0.6). Somewhat surprisingly, being older was not significantly related to a high number of sexual partners neither for males nor for females. Area of origin or educational level of head of household was

also not associated with a high number of sexual partners. However, stating that religion played a minor role in one's family was significantly related to having had a high number of sexual partners, doubling the probability, with a stronger association being indicated for female students than males (OR 2.2, 95% CI 1.01–4.8).

Female students with non-dominant bridging trust had an 80% higher probability of having had many sexual partners, a statistically significant finding (OR 1.8, 95% CI 1.2–2.9). The other social capital factors did not appear to be associated with this outcome.

None of the socioeconomic background factors showed a statistically significant association with did not always use a condom. Among social capital factors, low trust in others increased the risk of males not always using condoms by 70%, which was statistically significant (OR 1.7, 95% CI 1.1–2.8).

Based on these findings, the variables *trust in others* and *bridging trust* were chosen as determinants of sexual behaviors in a multivariate logistic analysis where we

Table 2b. Association (odds ratios, 95% confidence intervals) between sociodemographic factors, social capital, and ‘high number of lifetime sexual partners’ among university students in Uganda

	High number of lifetime sexual partners		
	All	Female	Male
Sociodemographic background factors	Odds ratios (95% CI)	Odds ratios (95% CI)	Odds ratios (95% CI)
Sex			
Male	1 (ref.)		
Female	0.4 (0.2–0.6)		
Age			
Younger	1 (ref.)	1 (ref.)	1 (ref.)
Older	1.3 (0.9–1.9)	1.8 (0.8–4.1)	1.1 (0.7–1.7)
Area of origin			
Urban/peri-urban	1 (ref.)	1 (ref.)	1 (ref.)
Small town			
Rural	1.1 (0.8–1.6)	0.9 (0.4–2.1)	0.9 (0.6–1.3)
Educational level of head of household			
High	1 (ref.)	1 (ref.)	1 (ref.)
Low	1.4 (0.9–2.1)	1.2 (0.8–2.0)	1.0 (0.3–2.9)
Role of religion			
Major role	1 (ref.)	1 (ref.)	1 (ref.)
Minor role	1.6 (1.1–2.3)	2.2 (1.01–4.8)	1.3 (0.9–2.0)
Trust in others			
High	1 (ref.)	1 (ref.)	1 (ref.)
Low	1.1 (0.7–1.6)	0.7 (0.3–1.8)	1.1 (0.7–1.8)
Social participation			
High	1 (ref.)	1 (ref.)	1 (ref.)
Low	1.1 (0.8–1.7)	1.2 (0.6–2.7)	1.1 (0.8–1.8)
Bridging trust			
Dominant	1 (ref.)	1 (ref.)	1 (ref.)
Non-dominant	1.6 (0.7–2.6)	1.6 (0.7–3.6)	1.8 (1.2–2.9)

adjusted for potential confounding factors. Table 3a–b presents the adjusted OR with 95% CI for associations between trust in others and bridging trust on the one hand, and the dependent variables on the other. Three models were used, with the confounding factors introduced stepwise, beginning with age and gender, then area of origin, and finally role of religion. The association between low trust in others and did not always use condoms persisted, even after adjusting for age, gender, rural origin, and role of religion. Moreover, the association between non-dominant bridging trust and high number of lifetime sexual partners also persisted after adjusting for age, gender, rural origin, and role of religion.

To further explore the pattern of association between factors of social capital and sexual behavior, we analyzed the possible effect modification between gender and ‘trust in others’ plus ‘bridging trust’ in relation to the outcome variables ‘previously had sex’ and ‘number of sexual partners’ (Table 4).

We found that trust in others had opposite effects among men and women. Men who reported low trust in others tended to have a 50% greater likelihood of having previously had sex (OR 1.5, 95% CI 0.98–2.2), while women reporting low trust in others had a 40% lower probability of previously having had sex, a statistically significant finding (OR 0.6, 95% CI 0.3–0.9). A similar difference in the impact of low trust in others was demonstrated regarding number of sexual partners. Furthermore, men with non-dominant bridging trust had a comparatively greater risk of having had a high number of sexual partners than women with social capital of this type.

We also found a synergistic effect between religion ‘played a minor role’ and ‘low trust in others’ in their bearing on ‘previously had sex’ but only among males. The same was true for the effect of ‘religion played a minor role’ and ‘non-dominant bridging trust’ on ‘high number of sexual partners’ but this time only among females. Women indicating non-dominant bridging trust

Table 2c. Association (odds ratios, 95% confidence intervals) between sociodemographic factors, social capital, and ‘did not always use condom with new partner’ among university students in Uganda

	Did not always use condom with new partner		
	All	Female	Male
Sociodemographic background factors	Odds ratios (95% CI)	Odds ratios (95% CI)	Odds ratios (95% CI)
Sex			
Male	1 (ref.)		
Female	1.3 (0.9–2.0)		
Age			
Younger	1 (ref.)	1 (ref.)	1 (ref.)
Older	1.0 (0.7–1.5)	1.1 (0.7–1.7)	1.0 (0.5–2.0)
Area of origin			
Urban/peri-urban	1 (ref.)	1 (ref.)	1 (ref.)
Small town			
Rural	1.1 (0.8–1.6)	1.1 (0.7–1.7)	1.1 (0.6–2.3)
Educational level of head of household			
High	1 (ref.)	1 (ref.)	1 (ref.)
Low	1.1 (0.7–1.8)	1.1 (0.7–1.9)	1.5 (0.6–4.1)
Role of religion			
Major role	1 (ref.)	1 (ref.)	1 (ref.)
Minor role	0.9 (0.6–1.3)	1.0 (0.6–1.5)	1.0 (0.5–1.7)
Trust in others			
High	1 (ref.)	1 (ref.)	1 (ref.)
Low	1.6 (1.1–2.4)	1.3 (0.6–2.8)	1.7 (1.1–2.8)
Social participation			
High	1 (ref.)	1 (ref.)	1 (ref.)
Low	1.1 (0.7–1.6)	1.2 (0.6–2.5)	1.0 (0.6–1.6)
Bridging trust			
Dominant	1 (ref.)	1 (ref.)	1 (ref.)
Non-dominant	1.0 (0.6–1.4)	1.1 (0.5–2.2)	0.9 (0.6–1.5)

and ‘religion played a minor role’ were more likely to have had a high number of sexual partners than could be expected from the increased risk previously demonstrated for these factors (Table 5).

Discussion

Our findings show that social capital factors are significantly associated with sexually risky behaviors among university students in southwestern Uganda. However, some of the social capital factors are differently associated with the sexual behavior among male and female students.

Low trust in others was significantly associated with a lower likelihood of having had sex among female students but not among males. However, for those students in our sample who had debuted sexually, low trust was associated with did not always use condoms in males, and non-dominant bridging trust was linked to having had many sexual partners regardless of the respondent’s

gender – even after adjusting for age, gender, area of origin, and role of religion.

Among females, the association between low trust in others and a lower probability of having had sex differed for those in whose families religion played a major role. The pattern for male students was different: having low trust in others and coming from a family in which religion played a major role increased the probability of having had sex.

Several studies have documented positive associations between social capital and health outcomes. Most research on the relationship between social capital and sexual behavior among youth and young adults has concentrated on social participation. However, there has previously been limited empirical evidence regarding the associations between sexual behavior (in terms of the ABC factors) versus trust in others and bridging trust.

In our study, did not always use condoms among males was significantly associated with low trust in others. This

Table 3a. Association (odds ratios, 95% confidence intervals) between trust in others and sexual behavior in a sample of Ugandan university students; results of multivariate logistic regression analyses

Sexual behavior factor	Model 1	Model 2	Model 3
	(adjusted for age and gender)	(adjusted for age, gender, and area of origin)	(adjusted for age, gender, area of origin, and role of religion)
Previously had sex			
Low trust in others	1.0 (0.7–1.3)	1.0 (0.7–1.3)	1.0 (0.7–1.3)
Rural		1.2 (0.9–1.6)	1.2 (0.9–1.7)
Minor role of religion			1.3 (0.95–1.7)
High number of lifetime sexual partners			
Low trust in others	1.0 (0.7–1.5)	1.0 (0.7–1.5)	1.0 (0.6–1.5)
Rural		0.8 (0.5–1.1)	0.8 (0.5–1.2)
Minor role of religion			1.8 (1.2–2.7)
Did not always use condom with new partner			
Low trust in others	1.6 (1.1–2.4)	1.6 (1.1–2.4)	1.6 (1.1–2.4)
Rural		1.2 (0.8–1.8)	1.2 (0.8–1.8)
Minor role of religion			1.0 (0.6–1.5)

differs from a cross-sectional study carried out among adolescents in the United States, where no associations were found between condom use and social capital as measured by Putnam's Social Capital Index. The results of that study showed a significant positive association among males between low level of social capital and having had many sexual partners. This agrees with our findings, except that no such association was discovered among females. The lack of agreement between the studies might perhaps be explained by differences in the operationalizing social capital. However, it is also possible that the answer lies in contextual differences between the settings.

Trust in others is regarded as a very general indicator of social capital. We can only speculate on why this factor had a different impact on the likelihood of sexual debut in males, as opposed to females. However, the associations between low trust in others and cautious sexual behavior in females might be explained by a higher level of vigilance and the fear of being exploited by males who are in a stronger position because of gender-determined power relations. Conversely, for males who have a higher power status than females (perhaps especially regarding sexual matters), there would be no rationale for cautious sexual behavior since a more powerful gender position eliminates the risk of being sexually exploited.

Table 3b. Association (odds ratios, 95% confidence intervals) between bridging trust and sexual behavior in a sample of Ugandan university students; results of multivariate logistic regression analyses

Sexual behavior factor	Model 1	Model 2	Model 3
	(adjusted for age and gender)	(adjusted for age, gender, and area of origin)	(adjusted for age, gender, area of origin, and role of religion)
Previously had sex			
Non-dominant bridging trust	1.1 (0.9–1.5)	1.1 (0.9–1.5)	1.1 (0.8–1.5)
Rural		1.6 (0.9–1.7)	1.2 (0.9–1.7)
Minor role of religion			1.2 (0.9–1.7)
High number of lifetime sexual partners			
Non-dominant bridging trust	1.8 (1.2–2.6)	1.8 (1.2–2.6)	1.8 (1.2–2.7)
Rural		0.8 (0.5–1.2)	0.8 (0.5–1.2)
Minor role of religion			1.6 (1.1–2.4)
Did not always use condom with new partner			
Non-dominant bridging trust	1.0 (0.7–1.5)	1.0 (0.7–1.4)	1.0 (0.7–1.4)
Rural		1.4 (0.9–2.1)	1.4 (0.9–2.1)
Minor role of religion			1.0 (0.7–1.5)

Table 4. Analysis of effect modification between trust in others/bridging trust and sex regarding ‘previously had sex’ and ‘high number of lifetime sexual partners’ in a sample of Ugandan university students ($n = 980$), presented as adjusted odds ratios, 95% confidence intervals (CI)

Sex and trust in others	Previously had sex	
	All n (%)	Odds ratios (CI) ^a
Sex/trust in others		
Female/high trust	173 (21)	1 (ref)
Male/high trust	330 (39)	1.1 (0.8–1.6)
Female/low trust	111 (13)	0.6 (0.3–0.9)
Male/low trust	223 (27)	1.5 (0.98–2.2)
(Missing)	(143)	
Total	980	
Sex and trust in others/ bridging trust		
	High number of lifetime sexual partners	
	All n (%)	Odds ratios (CI)
Sex/trust in others		
Female/high trust	93 (22)	1 (ref)
Male/high trust	179 (40)	2.4 (1.4–4.2)
Female/low trust	45 (10)	0.8 (0.3–1.8)
Male/low trust	125 (28)	2.7 (1.5–4.9)
(Missing)	(90)	
Total	532	
Sex/bridging trust		
Female/dominant bridging trust	67 (15)	1 (ref)
Male/dominant bridging trust	143 (32)	2.7 (1.3–5.3)
Female/non-dominant bridging trust	69 (15)	1.5 (0.7–3.3)
Male/non-dominant bridging trust	168 (38)	4.7 (2.4–9.2)
(Missing)	(85)	
Total	532	

^aAdjusted for age.

Table 5a. Analysis of effect modification between trust in others/bridging trust and role of religion regarding ‘previously had sex’ in a sample of Ugandan university students ($n = 980$), presented as adjusted odds ratios with 95% confidence intervals (CI)

Role of religion and trust in others/ bridging trust	Previously had sex					
	All n (%)	Odds ratios (95% CI) ^a	Female n (%)	Odds ratios (95% CI) ^a	Male n (%)	Odds ratios (95% CI) ^a
Role of religion/trust in others						
Major role/high trust	280 (34)	1 (ref)	107 (38)	1 (ref)	173 (31)	1 (ref)
Minor role/high trust	219 (26)	1.1 (0.7–1.5)	65 (23)	0.8 (0.5–1.6)	154 (28)	1.2 (0.8–1.8)
Major role/low trust	176 (21)	1.3 (0.6–1.2)	62 (22)	0.5 (0.2–0.9)	114 (21)	1.1 (0.7–1.8)
Minor role/low trust	156 (19)	1.3 (0.9–1.9)	48 (17)	0.6 (0.3–1.2)	108 (20)	1.9 (1.1–3.2)
(Missing)	(149)		(65)		(84)	
Total	980		347		633	

^aAdjusted for age.

The absence of a gender difference in the association between bridging trust and did not always use condoms might be explained by the ‘negotiation’ situation, where the decision whether or not to use a condom may be more tied to personal characteristics such as self-efficacy than to factors related to structural gender power relations.

For both male and female students, non-dominant bridging trust was linked to having many sexual partners. The difference between general trust in others and bridging trust is that the latter concerns the foremost trust in individuals outside the respondent’s ‘primary’ group, as defined by family ties, age, social status, and in some instances religious affiliation. Thus, non-dominant bridging trust could signify a sense of ‘us and them.’ This could mean that sexual partners are chosen within the narrow circle of ‘us’ where trust is very high; or, conversely, sought among the ‘them’ category in order to make behavior that is unacceptable to one’s peer group less visible. The information retrieved in this study is insufficient to assess which of these hypotheses is more plausible.

The association between low trust in others and low risk for having had sex was particularly pronounced in the case of those women who stated that religion played a major role in their family of origin. It differed from the pattern among male students where the two cited variables acted synergistically. This observation further supports our interpretation of unequal gender relations where differences in which vary sexual behavior among females is a precaution taken in order not to risk sexual exploitation by the dominant gender. Thus, the theory of unequal gender relations may be a possible explanation of our findings.

Females who reported religion playing a minor role in their family might have been raised in a less traditional environment with regard to gender roles. In combination with non-dominant bridging trust (the notion of ‘us and

Table 5b. Analysis of effect modification between trust in others and bridging trust and role of religion regarding ‘high number of lifetime sexual partners’ in a sample of Ugandan university students (n = 980), presented as adjusted odds ratios with 95% confidence intervals (CI)

Role of religion and trust in others/bridging trust	High number of lifetime sexual partners					
	All <i>n</i> (%)	Odds ratios (95% CI) ^a	Female <i>n</i> (%)	Odds ratios (95% CI) ^a	Male <i>n</i> (%)	Odds ratios (95% CI) ^a
Role of religion/trust in others						
Major role/high trust	150 (34)	1 (ref.)	60 (44)	1 (ref.)	90 (30)	1 (ref.)
Minor role/high trust	120 (27)	1.7 (1.1–2.9)	33 (24)	2.0 (0.8–5.2)	87 (29)	1.5 (0.8–2.7)
Major role/low trust	83 (19)	1.1 (0.6–1.9)	23 (17)	0.4 (0.01–1.9)	60 (20)	1.1 (0.6–2.2)
Minor role/low trust	86 (20)	1.8 (1.1–3.2)	21 (15)	2.0 (0.7–6.0)	65 (21)	1.5 (0.8–2.9)
(Missing)	(93)		(19)		(74)	
Total	532		156		376	
Role of religion/bridging trust						
Major role/dominant	111 (25)	1 (ref.)	39 (29)	1 (ref.)	72 (23)	1 (ref.)
Minor role/dominant	97 (22)	1.8 (1.0–3.3)	27 (20)	1.3 (0.4–4.4)	70 (23)	1.9 (0.96–3.8)
Major role/non-dominant	129 (29)	1.8 (1.1–3.2)	45 (33)	1.0 (0.3–3.0)	84 (27)	2.3 (1.2–4.6)
Minor role/non-dominant	107 (24)	2.9 (1.6–5.0)	24 (18)	3.3 (1.03–10.3)	83 (27)	2.6 (1.3–4.9)
(Missing)	(88)		(21)		(67)	
Total	532		156		376	

^aAdjusted for age.

them') this could have led to less conservative sexual behavior along the lines of both mechanisms suggested above (i.e. seeking partners within or outside of one's own primary group).

Study limitations

The study design was cross-sectional, leaving the causal direction open, although it appears more plausible that social capital would affect sexual behavior than vice-versa. According to our calculations of statistical power, the sample size was adequate for the main analyses although somewhat small for assessing effect modification without risking a type two error; that is, erroneously accepting the null hypothesis when it should be rejected.

We believe that selection bias was a minor problem in our study because of the relatively high response rate (80%). Regarding the issue of misclassification, it might be argued that there was a risk for dependent misclassification since the groups with strict moral rules (i.e. those in which religion played a major role) might systematically have underestimated risky sexual behavior due to a 'social desirability' factor. In principle, this could have led to an exaggeration of certain associations; but since the link between religion and behavior did not show a uniform pattern, we do not think misclassification can have had a major influence on our results.

We controlled our main analyses for the available sociodemographic factors, including the head of household's educational level in the family of origin since several studies have shown an association between social capital factors and SES. However, we cannot exclude confounding from sources unrepresented in this study.

In Uganda, less than 10% of an age cohort continues on to tertiary education and it is clearly the children of the most affluent families who do so. We, therefore, believe that it may be difficult to generalize the findings of this study to the same age cohorts of the country's general youth population. Having said this, since affluent urban dwellers seem to be very much the focus of the new religious movements including the 'born-again' Christians (24), university students in Uganda could very well represent a particular strategic group where the encounter between the concepts of social capital and religion and the impact of this on sexual behavior may best be understood in general terms.

Conclusions

Social capital, measured in terms of trust in others and bridging trust, was associated with the ABC behaviors. However, gender and the importance of religion appeared to modify the effect of social capital in a way that fails to support the notion that risky sexual behavior is automatically reduced by increasing social capital within a highly religious context. Our findings indicate the importance of understanding the interplay between

social capital, religious influence, and gender issues in order to invest resources effectively in HIV/AIDS preventive strategies in Uganda. Policy makers would benefit from consulting relevant interest groups to better understand how feasible policy goals could be formulated and to increase their ability to choose implementation strategies relevant and acceptable for the target groups. In addition, the results justify a need for further research regarding the complex relationship between social capital and sexual behavior and the differing impact these factors may have on men and women.

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References

1. Cohen J. ABC in Uganda: success or subterfuge? *HIV AIDS Policy Law Rev* 2005; 10: 23–4.
2. Slutkin G, Okware S, Naamara W, Sutherland D, Flanagan D, Carael M, et al. How Uganda reversed its HIV epidemic. *AIDS Behav* 2006; 10: 351–60.
3. Putzel J. The politics of action on AIDS: a case study of Uganda. *Public Adm Dev* 2004; 24: 19–30.
4. Muriisa R. The AIDS pandemic in Uganda, social capital and the role of NGOs in alleviating the impact of HIV/AIDS. Saarbrücken: Verlag Dr. Müller; 2009.
5. Frumence G, Killewo J, Kwesigabo G, Eriksson M, Nyström L, Emmelin M. Social capital and HIV transmission – a case study in three villages in the Kagera region of Tanzania. *SAHARA* 2010 (accepted for publication).
6. Putnam R. *Making democracy work. Civic traditions in modern Italy*. Princeton, NJ: Princeton University Press; 1993.
7. Wilkinson RG. Income distribution and life expectancy. *BMJ* 1992; 304: 165–8.
8. Subramanian SV, Kim DJ, Kawachi I. Social trust and self-rated health in US communities: a multilevel analysis. *J Urban Health* 2002; 79: S21–34.
9. Ziersch AM, Baum FE. Involvement in civil society groups: is it good for your health? *J Epidemiol Community Health* 2004; 58: 493–500.
10. Myer L, Stein DJ, Grimsrud A, Seedat S, Williams DR. Social determinants of psychological distress in a nationally-representative sample of South African adults. *Soc Sci Med* 2008; 66: 1828–40.
11. Beaudoin CE. Bonding and bridging neighborliness: an individual-level study in the context of health. *Soc Sci Med* 2009; 68: 2129–36.
12. Stafford M, De Silva M, Stansfeld S, Marmot M. Neighbourhood social capital and common mental disorder: testing the link in a general population sample. *Health Place* 2008; 14: 394–405.
13. Poortinga W. Do health behaviors mediate the association between social capital and health? *Prev Med* 2006; 43: 488–93.

14. Poortinga W. Social relations or social capital? Individual and community health effects of bonding social capital. *Soc Sci Med* 2006; 63: 255–70.
15. Macinko J, Starfield B. The utility of social capital in research on health determinants. *Milbank Q* 2001; 79: 387–427, IV.
16. Pronyk PM, Harpham T, Busza J, Phetla G, Morison LA, Hargreaves JR, et al. Can social capital be intentionally generated? A randomized trial from rural South Africa. *Soc Sci Med* 2008; 67: 1559–70.
17. Pronyk PM, Kim JC, Abramsky T, Phetla G, Hargreaves JR, Morison LA, et al. A combined microfinance and training intervention can reduce HIV risk behaviour in young female participants. *AIDS* 2008; 22: 1659–65.
18. Erulkar A, Ferede A. Social exclusion and early or unwanted sexual initiation among poor urban females in Ethiopia. *Int Perspect Sex Reprod Health* 2009; 35: 186–93.
19. Crosby RA, Holtgrave DR. The protective value of social capital against teen pregnancy: a state-level analysis. *J Adolesc Health* 2006; 38: 556–9.
20. Camlin CS, Snow RC. Parental investment, club membership, and youth sexual risk behavior in Cape Town. *Health Educ Behav* 2008; 35: 522–40.
21. Holtgrave DR, Crosby RA. Social capital, poverty, and income inequality as predictors of gonorrhoea, syphilis, chlamydia and AIDS case rates in the United States. *Sex Transm Infect* 2003; 79: 62–4.
22. Putnam R. Comprehensive social capital index; 2001. Available from: <http://www.bowlingalone.com> [cited 27 May 2010].
23. Campbell C, Williams B, Gilgen D. Is social capital a useful conceptual tool for exploring community level influences on HIV infection? An exploratory case study from South Africa. *AIDS Care* 2002; 14: 41–54.
24. Gifford P. African Christianity. Its public role in Uganda and other African countries. Kampala: Fountain Publishers; 1999.
25. Duff O. Public health and religion: Aids, America, abstinence. *The Independent*, 1 June 2006.
26. Hanson BS, Ostergren PO, Elmstahl S, Isacson SO, Ranstam J. Reliability and validity assessments of measures of social networks, social support and control – results from the Malmo Shoulder and Neck Study. *Scand J Soc Med* 1997; 25: 249–57.
27. Rothman KJ. *Modern epidemiology*. Boston, MA: Little, Brown; 1986.

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