Religiosity and sexual risk behavior among Croatian college students, 1998-2008

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Abstract

Substantial increase in religious identification was observed in most European post-communist countries. As religiosity has been associated with STI/HIV vulnerability among young people, this paper examined the impact of religious upbringing and personal religiosity (religiousness) on sexual risks among the University of Zagreb first-year undergraduate students using data collected in 1998, 2003, and 2008. Female participants who reported strict

religious upbringing were less knowledgeable about human sexuality than other women. Religiousness was negatively correlated with basic knowledge of human sexuality, but again only among women. Contrary to expectations, no significant associations were found between religious upbringing or religiousness and condom use. Both measures of religiosity, however, were related to the decreased odds of sexual debut among young women. In the case of male participants, the impact of religiosity was marginal. Religious upbringing was associated (negatively) with sexual literacy and sexual debut – but only at the beginning of the observed period. Overall, religiosity does not seem to substantially reduce STI/HIV-related risk taking, particularly among men. Since the observed increase in the proportion of sexually active students during the 1998-2008 period was not matched by an increase in condom use, reducing STI/HIV vulnerability among Croatian youth remains an essential task.

Introduction

Adolescents and young adults are at greater risk of contracting sexually transmitted infections (STIs) because they are more likely to have unprotected sex and to have multiple partners, as well as high risk partners (Panchaud, Singh, Feivelson, & Darroch, 2000). A meta-analysis of 121 empirical studies concerning heterosexual condom use (Sheeran, Abraham, & Orbell, 1999) reported that although condom use has increased since the early 1980s, the absolute levels of use remained low. Studies dealing with sexual risk taking among adolescents and young adults in Croatia reported a similar trend: the level of condom use did rise in the last fifteen years (Hiršl-Hećej & Štulhofer, 2001; Štulhofer, Ajduković, Božičević, & Kufrin, 2006), but a majority of young adults (80%) did not use condoms consistently. This trend is in part reflected in the fact that HIV/AIDS, the most severe of all STIs, remains overwhelmingly present among young people, with 45% of new HIV infections worldwide being diagnosed among persons aged 15-24 (UNAIDS, 2008).

Religiosity is an important factor in assessing young people's vulnerability to HIV and other STIs. As eloquently stated in a recently published monograph on the subject, religion always makes a difference in the context of young people's sexuality (Regnerus, 2007). Its influence is also often gender-specific, with sexuality of young women being seemingly more susceptible to religious norms than that of their male counterparts (Meier, 2003; Rizzi, 2004; Rostosky, Wilcox, Corner Wright, & Randall, 2004). Religiosity not only affects values and attitudes toward sex, but also both sexual decision-making and sexual behavior (Brewster, Cooksey, Guilkey, & Rindfuss, 1998; Rostosky *et al.*, 2004). This is hardly a surprise considering that human sexuality has great religious relevance, which is cross-culturally reflected in religious regulation of, or attempts at regulating, school-based sex education, condom use and distribution, and gay and lesbian rights (Irvine, 2002). This point is particularly relevant bearing in mind the official teaching on sexuality of the global Catholic Church since, in the latest census in Croatia carried out in 2001, 88% of the population reported being Roman Catholic. It has promoted married life as an exclusive location of sexual activity while it has strongly condemned usage of contraceptives (Pope Paul IV, 1968; Pope John Paul II, 1984; Pope Benedict XVI, 2008; 2009).

Conceptually, the association between religiosity and sexuality can be approached at different levels (Bearman & Bruckner, 1999). More precisely, one or more causal mechanisms underlying this association may be related to (a) a personal dimension, which consists of specific individual beliefs, (b) a family dimension, where certain values are socialized and/or imposed through social control (comparatively, religious parents talk less with their children about sexuality, but more about sexual morality; Regnerus, 2007), and (c) a peer dimension, which is both an arena for building and maintaining one's personal reputation, and a social space thick with mutual expectations, influence and conformity. For example, peers are often that crucial factor in the selection of sources of information about

sexuality. These three levels are often interconnected, as in the case of teenagers who were brought up religiously and, as a consequence, have internalized specific moral norms characteristic of their religion. Such beliefs will, directly (by their choice) and indirectly (by others' choice), guide them in choosing their friends, which will – assuming they were successful in becoming a part of a group of like-minded peers – reinforce their beliefs (Mott, Fondell, Hu, Kowaleski-Jones, & Menaghan, 1996).

In this paper, religiosity is defined differently than is customary in sociological studies, in which it usually denotes formal religious participation (as opposed to faith). Here, the term religiosity is understood as both the self-assessed importance of religion, or religiousness (personal dimension; *religiousness*), and the influences or pressures of one's primary social environment (family), which affect personal importance of religion. This definition was less a matter of conceptual taste, and more a decision based on evidence that religious convictions remain rather stable through adolescence, whereas participation in worship services seems to decline during adolescent years (Rostosky *et al.*, 2004).

The Croatian Context

During the 1990s, post-communist societies experienced substantial transitional costs, such as the increase in unemployment, poverty and social inequality, general sense of uncertainty, the declining quality of public services and a widely perceived absence of the rule of law (Štulhofer & Sandfort, 2005). In Croatia, the context bears a specific significance because the transition to market economy and multi-party political system coincided with the 1991-1995 war that followed the breakup of Yugoslavia. The closely related process of ethno-national identification and homogenization promoted by the conservative, authoritarian government was coupled with a rapidly increasing influence of the Catholic Church, which was widely considered the guardian of Croatian national identity during the Communist times

(Zrinščak, 1995). Bilateral agreements with Vatican which resulted, among other things, in the introduction of religious education in primary and secondary schools in 1997, were a clear sign of the new social and political power of the Catholic Church.

In Croatia, where 89% of young people in a national survey carried out in 1999 identified themselves as Roman Catholics (Marinović Jerolimov, 2002), rejection of condoms has been strongly advocated by the Catholic Church, as publicized on several occasions (Bijelić, 2008). One of the last such instances was the press conference organized by the Croatian Conference of Bishops in February 2004, during which the only existing school-based HIV prevention program (*MemoAIDS*) among teenagers was heavily criticized for promoting sexual activity and condom use (Štulhofer, 2005). In addition to this negative evaluation of condom use based on moral grounds, misinformation about condom efficiency in preventing STIs is often used to reinforce the moralistic message.

A number of studies have examined retraditionalization and increasing religiosity in Central, East, and Southeast Europe. Analyzing social and religious change before and after the demise of communism in Croatia, Zrinščak (2001) concluded that a trend of secularization, observable in the 1960s and 1970s, was reversed by a religious revitalization at the end of the 1980s (Bahtijarević & Milas, 1990). This desecularization maintained traditional features, as pointed out by another scholar (Marinović Jerolimov, 2002). To a significant extent, desecularization thus served as a process of retraditionalization. A recently conducted study demonstrated that, among young people in Croatia, religious identification significantly increased during the 1986-1999 period (Ilišin & Radin, 2007). However, the authors were careful to note that retraditionalization in this population was counteracted by the strong presence of the contemporary culture of individualism. It is therefore important to take into account these social and cultural shifts when considering possible changes in youth sexuality during the last decade.

Religiosity and Sexual Risks

Several possible risk-reducing and risk-enhancing effects of religiosity on sexual risk taking among young people emerge in the literature. In a recent review of longitudinal studies on adolescent sexual behavior published in between 1980 and 2001, the impact of religiosity on adolescent sexual behavior was described as twofold: religiosity may delay sexual debut, but it may also negatively affect subsequent contraceptive use (Rostosky *et al.*, 2004). The postponement of sexual activity was confirmed only among female adolescents, while the results were inconclusive for males. Using data from the National Longitudinal Study on Adolescent Health in the U.S.A., Meier (2003) found that higher religiosity reduces the probability of having an early sexual initiation for both male and female adolescents, with the effect being larger among females. Similar findings were reported by Rostosky and colleagues (Rostosky, Regnerus, & Wright Corner, 2003) and, in the European context, by Rizzi (2004). A delayed onset of penetrative sexual activity may be the result of internalized moral values. As already mentioned, sexual abstinence before marriage is strongly promoted by the Catholic Church, and this attitude could be funneled through religious service attendance along with stronger social control in families with rigid religious convictions (Forste & Haas, 2002). As noted by Wallace and Williams (1999), another risk-reducing effect of religiosity, when sexual activity has already been initiated, could be a lower number of sexual partners.

On the risk-enhancing side, religious individuals might be less knowledgeable about sexual and reproductive health issues than their non-religious peers due to restrictive moral norms in their respective families. Such upbringing, which encourages discussion on sexual morality while discouraging conversation about sexuality, may also have a negative impact on the availability of relevant information (Regnerus, 2005). In addition, religious young people might hold less positive views regarding condom use and be less likely to use efficient

protection when sexually active, as the religious norms that they accept and respect reject the use of artificial family planning methods (Zaleski & Schiaffino, 2000). Furthermore, religious individuals may be less cognitively susceptible to planning their sexual encounters (Ladin L'Engle, Jackson, & Brown, 2006), which would, in turn, make them less prepared and less likely to use protection (Dodge, Sandfort, Yarber, & de Wit, 2005). Unfortunately, many of these questions remain to be explored. As Rostosky and colleagues (2004) pointed out, empirical analyses of the causal mechanisms behind the impact of religiosity on sexual behavior have thus far been surprisingly rare.

The influence of religiosity on young people's sexuality was reported in several research studies carried out in Croatia. In 1998, religious upbringing was found to reduce sexual risk taking, but only among college men (Štulhofer, Jureša, & Mamula, 2000). Another study reported an association between school-based religious education and a decrease in sexual permissiveness during the 1998-2003 period (Štulhofer, Anterić, & Slošar, 2004). In a more recent national study of young people aged 18-24, the acceptance of religiously inspired sexual morality was shown to adversely affect the odds of using a condom at first sexual intercourse, although only among young women (Štulhofer, Graham, Božičević, Kufrin, & Ajduković, 2007). Another recent study analyzed the association between religiosity and the Sociosexual Orientation Inventory scores in a sample of college students. Again, the association reached significance only among female participants (Kardum, Gračanin, & Hudek-Knežević, 2008).

Research Hypotheses

The aim of this repeated cross-sectional study was to analyze the dynamics of association between religious upbringing and HIV/STI relevant knowledge and sexual behaviors among the University of Zagreb first-year undergraduates in the period between 1998 and 2008. An

additional focus was on possible relationships between the knowledge and behaviors on the one hand and religiousness (current religious identity) on the other hand. Informed by the existing literature, four hypotheses were formulated. The first two hypotheses explore a positive, risk-reducing role of religiosity, while the third and fourth focus on a risk-enhancing potential:

(i) Religiosity delays sexual debut;

(ii) Religiosity reduces the lifetime number of sexual partners;

(iii) Religiosity is associated with lesser knowledge of human sexuality;

(iv) Religiosity is related to lower odds of condom use.

It should be noted here that we do not regard young adults' sexual activity as risky *per se*. The exposure to HIV/STI risks is, obviously, a more complex issue. However, in comparison to sexual inactivity, an active sex life usually increases risk exposure. Similarly, having two or more sexual partners does not necessarily mean that one is more exposed to STIs or HIV than a person who reported only one sexual partner, but taking into account the prevalence of inconsistent condom use among young people in Croatia (Štulhofer *et al.*, 2000; 2004; 2007), having more sexual partners is associated with an increased exposure to STIs.

All analyses were carried out separately for women and men to examine possible gender-specific influences of religiosity on sexual behavior. Sexual socialization of young people is under considerable impact of gender-specific norms that are often characterized by double standards in regards to sex-related expectations and freedom of sexual expression (Traeen, Lewin, & Sundet, 1992; Ricardo, Barker, Pulerwitz, & Rocha, 2006). It has thus become a common practice to analyze data on youth sexuality by gender (cf. Udry, 1988; Small & Luster, 1994; Vanwesenbeeck, Bekker, & van Lenning, 1998; Netting & Burnett, 2004; Štulhofer *et al*., 2007).

Methods

Participants

The study was initiated in 1998 when 1355 University of Zagreb first-year students were surveyed using a KABP (knowledge-attitudes-beliefs-practices) self-administered questionnaire. Women made 47.2% of the sample, in which the average participant age was 18.7 (SD=.84). In the second wave, which was conducted in 2003, 537 first-year undergraduates from the same university were surveyed. This time, women constituted a slight majority (53.1%). The average age in the sample was 18.9 (SD=.88). The third wave was carried out in 2008 and it sampled 775 University of Zagreb first-year students, 55.2% of which were women. The average age (M=19.5; SD=.98) was slightly higher than in the first two waves.

The same sampling strategy was used in all three waves. After information about university admissions in the previous year (or, if unavailable, from the year before) was obtained, sampling quotas for each university school (31 in total) were determined. The quotas were proportional to school size and stratified by gender. In 1998, 8% of the first-year undergraduate student body was surveyed. In 2003 and 2008 the proportion was reduced to 4% and 5%, respectively. After the quotas were set, one first-year course per school was randomly chosen and all students attending this course were surveyed. In cases where the number of surveyed first-year students exceeded the quota, the required number was obtained by trimming down the subsample using a random number generator. In cases where it was smaller than required, another course in the same school was chosen and the attending students surveyed.

In all three waves the discrepancy between the planned and achieved sample was minimal (1-6%, depending on the study wave), both in regard to size and gender composition.

Data Collection and Questionnaire

In all three waves, surveying was carried out in classrooms. To secure confidentiality, a team of one female and one male research assistant instructed participants to disperse so that no one would be able to see what they are writing. In the rare case of heavily populated classes a different strategy was used: students were divided into two groups of roughly equal size and surveyed in succession.

On average, the questionnaire took about 20 minutes to complete. It was pretested in 1998 for comprehension and scale reliability on 413 high-school seniors (Štulhofer, 1999). From one wave to another, the questionnaire contents were changed by less than 10%. The number of items ranged from 119 in 1998 to 109 in 2008. The forms returned with 10% or more of missing values were excluded from analyses.

The questionnaire was organized into three main sections: (a) sexual literacy (basic knowledge about reproductive and sexual health), (b) sexual experiences and behaviors and (c) sexual attitudes and beliefs. The last section included indicators of sexual risk self-assessment. The questionnaire also contained questions about participants' sociodemographic characteristics and religiosity.

Measures

Age, parents' education (1=elementary school, 2=high school, 3= university; father's and mother's education were recorded separately and later averaged into a single variable), current relationship status (1=single, 2=in a relationship), and the type of longest place of residence (1=village, 2=town, 3=city, 4=metropolitan city) were assessed as sociodemographic characteristics.

Religious upbringing was measured by the following single-item indicator: "Were you brought up in the religious spirit?" The following answers were offered: (1) no, (2) yes, but

not strictly, and (3) yes, strictly. Personal religiosity (religiousness) was assessed only in the 2008 wave using a 5-item religiosity scale previously validated on a large sample of Croatian high-school students (Bezinović, Marinović Bobinac, & Jerolimov, 2005). The scale consisted of the following items: "I believe in God", "I have a feeling that God protects me", "I am afraid of God's punishment", "My faith helps me to overcome problems and difficulties in life", and "I think a lot about faith, religion, and God". The items were measured on a Likert-type acceptance scale ranging from 1= "strongly disagree" to 5= "strongly agree". Linear combination of the items had satisfactory internal consistency (Cronbach α=.88). In 2008, the two indicators of religiosity (religious upbringing and personal religiousness) were moderately to strongly correlated (r=.52, p<.001).

The Index of Sexual Literacy (ISL), originally a 10-item composite measure developed in the first study wave (Štulhofer *et al.*, 2000), was used to measure basic knowledge of human sexuality. Conceptually, it has been argued that low ISL scores may have adverse personal sexual health consequences (ISL asks about the length of the menstrual cycle, whether certain diseases are sexually transmittable, how is HIV/AIDS transmitted, whether masturbation is a health hazard, why is the withdrawal method an unreliable method of birth control, etc.). Questions had a multiple-choice format with four answers, only one of which was correct. The index was calculated by summing correct answers. In this study, the ISL was composed of only eight items, since the content of the remaining two changed from one wave to another.

Exposure to sexual risks was assessed with several single-item indicators: experience of sexual intercourse, condom use at first and last sexual intercourse (the latter being asked only in the 2003 and 2008 study waves), condom use consistency, and lifetime number of sexual partners. Consistent use of condoms was assessed with the question regarding the pattern of condom use. If a participant reported to "always" use condoms, the answer was

coded 1 for consistent use. All other answers ("I never use condoms", "I use them occasionally", "I use them only with casual partners", and "I use them only at the beginning of a relationship") were coded 0 for inconsistent use. Due to its skewed distribution, lifetime number of sexual partners was recoded into four categories (1=one sexual partner, 2=two partners, 3=three to four partners, 4=five or more partners).

Self-assessed HIV and STI related risks were measured by the following questions: "How would you rate your personal risk of acquiring HIV infection?" and "How would you rate your personal risk of acquiring any other STI?" A 5-point scale (from 1="no risk" to 5="extremely high risk") was used for answers. These two strongly correlated items (r=.65-.78, p<.001) were combined into a single variable ranging from 2 to 10. The higher the score, the higher the self-assessed HIV/STI risk.

Traditional morality was assessed with the Traditional Sexual Morality Scale (Štulhofer *et al.*, 2004), which consists of seven items such as: "Homosexuality is unacceptable", "Abortion should be illegal", and "Religion is the best guide in sexual matters". The items were measured on a Likert-type acceptance scale ranging from 1= "strongly disagree" to 5= "strongly agree". All items loaded highly (>.55) on a single factor with Eigenvalue >1. Linear combination of the items had satisfactory internal consistency in all three waves (Cronbach α=.78-.81). Higher scores on this composite measure with absolute range 7-35 reflected stronger acceptance of traditional morality.

Data Analytic Strategy

First we explored gender differences in socio-demographic and socio-sexual indicators within each study wave using chi-square tests and t-tests. In the next step, the focus was on differences among the three waves. Chi-square tests and one-way ANOVAs (with Bonferroni post-hoc test) were carried out to identify possible trends in the data. Finally, the four research

hypotheses outlined in the previous chapter were tested using several logistic and OLS multiple regression models. Correlates of the experience of sexual intercourse and condom use were explored by logistic regression models, while correlates of lifetime number of partners and age at first sexual intercourse were analyzed using linear regression models. Participants' age, their parents' education, and place of residency were controlled for in all models. When conceptually justified, additional predictors were added in the models exploring condom use. To examine the possible effects of collinearity between the two religiosity measures (religious upbringing and religiousness) in the 2008 dataset, regression models were first carried out with both measures included and then repeated with separate (alternating) entry.

Results

Descriptive Analysis

In the observed period, several significant gender differences in socio-demographic characteristics were found (Table 1). In 1998, male participants were somewhat older than female participants (χ^2=17.78, p<.001). In 1998 and 2008, more men then women reported mothers with higher education (χ^2=6.79, p<.05 and χ^2=6,25, p<.05, respectively). Finally, women were more likely then men to report being in a relationship (χ^2_{2003}=14.20, p<.001 and χ^2_{2008}=18.35, p<.001) and having one or more same-sex sexual experiences.[2] The latter difference reached statistical significance in 2003 and 2008 (χ^2=14.77, p<.001 and χ^2=33.97, p<.001, respectively).

[2] It should be noted, however, that the measure used to assess same-sex sexual activity was imprecise ("Have you ever had a sexual experience – that is, a physical contact that resulted in sexual arousal – with a person of the same sex?")

When sexual behavior was analyzed, men consistently reported first intercourse at younger age then women (t_{1998}=3.74, df=763, p<.001, t_{2003}=2.35, df=316, p<.05, and t_{2008}=2.42, df=533, p<.05). At all three observation points, male participants reported more sexual partners than women (χ^2_{1998}=57.43, p<.001, χ^2_{2003}=7.87, p<.05, and χ^2_{2008}=23.02, p<.001). Gender differences were also found in the use of protection at first and last sexual intercourse, primarily with regard to hormonal pill and condom use. While more women than men reported using the pill with their partners, with condom use it was the opposite case.

TABLE 1 ABOUT HERE!

Table 2 presents differences in religiosity and STI/HIV-relevant knowledge and sexual behaviors among the three data collection waves. There was a significant change in the prevalence of religious upbringing among Croatian college students in the 1998-2008 (χ^2=26.79, p<.001). The percentage of first-year undergraduates growing up in a non-religious family decreased, mostly between 1998 and 2003, while the proportion of those who were socialized in a strict religious spirit slightly increased from 1998 to 2003 and then stabilized at around 30%.

No clear trend was found in the dynamics of sexual literacy. Elementary knowledge of reproductive and sexual health issues remained the same in the 1998-2003 period and then significantly improved in 2008 (F=11.38, p<.001).

In regard to sexual behavior, a steady increase in the proportion of sexually experienced participants emerged (χ^2=33.26, p<.001), particularly between 2003 and 2008, when a 10% increase was observed. Interestingly, this trend was also observed among young people with strong religious convictions (the group was defined by strict religious upbringing and a high score, beyond 80th percentile, on traditional morality scale), where the proportion of sexually experienced individuals has more than doubled in the last ten years (from 22% to 47%). When analyzing other changes in sexual behavior, statistically significant differences

were found only in the case of condom use at first intercourse, where a positive trend was observed (χ^2=41.89, p<.001).

TABLE 2 ABOUT HERE!

Religiosity as Risk-Reducing Factor: Sexual Initiation and Number of Sexual Partners

The first hypothesis postulated the delaying effect of religiosity on the timing of the first sexual intercourse. Table 3 shows the findings from multiple logistic regression analysis with experience of sexual intercourse as dependent variable. When controlling for age, parents' education, place of residency, and knowledge about sexuality, religious upbringing significantly decreased the odds of sexual initiation. The effect, however, was consistent only among women. Being religiously brought up decreased the odds of having commenced sexual activity by 37-54 percent. Among already sexually active women, though, religious upbringing was not a significant predictor of age at first intercourse. Among men, religious upbringing was a significant (negative) predictor of sexual debut only in 1998. In 2008, religiousness, or personal importance of religion, was significantly and negatively associated with the experience of sexual intercourse (cf. Table 3) and age at first sexual intercourse (β=.20, SE=.02, p<.01), but only among women.

TABLE 3 ABOUT HERE!

The association between religiosity and the number of sexual partners, stipulated by the second hypothesis, was not confirmed. A multiple OLS regression model that used the identical set of predictors as the model presented above, was carried out with lifetime number of partners as dependent variable (results not shown here). Contrary to expectations, religious upbringing was not found a significant predictor of the number of sexual partners in the 1998-2008 period, either among women or men. However, in 2008 religiousness was significantly

and negatively associated with reporting more than one lifetime sexual partner among women (β=-.32, SE=.01, $p<.01$).

Religiosity as Risk-Enhancing Factor: Sexual literacy and Condom Use

Our third hypothesis, which posited negative association between religiosity and basic knowledge about human sexuality found some empirical support. When controlled for age, parents' education, and place of residency, sexual literacy was significantly and negatively correlated to religious upbringing in 1998 and 2008, both among women and men (Table 4). In the 2003 wave, associations (although in the expected direction) did not reach statistical significance. Regardless of gender, personal religiosity (religiousness) was also associated with lower scores on the Index of Sexual Literacy. No gender differences in the magnitude of correlations between (the two measures of) religiosity and sexual literacy were observed.

It should be noted that the percentage of variance in sexual literacy explained by these regression models ranged from .02 to .09, pointing to a marginal influence of religiosity on basic sexual knowledge.

TABLE 4 ABOUT HERE!

According to the last hypothesis, religiosity might discourage condom use. To test this hypothesis a multiple logistic regression model controlling for age at first sexual intercourse, parents' education, place of residency, and sexual literacy was carried out with condom use at first intercourse as dependent variable (results not shown here). Significant effects of religious upbringing were not found. Similarly, religious upbringing was not a significant predictor in models in which condom use at last intercourse and consistent condom use were used as dependent variables (in the consistent use model, lifetime number of sexual partners and self-assessed HIV/STI risk were added as additional correlates). Finally, using only the 2008 dataset, the three regression models described above were extended by adding religiousness

among the predictors. Again, no significant associations between religiousness and condom use were found.

To test the possibility that religiosity did not affect condom use because of only a few sexually active religious participants in the samples, we created a subgroup of participants with strong religious convictions. Inclusion criteria were (a) being raised in a strictly religious family and (b) having a high score on the Traditional Sexual Morality Scale (80^{th} percentile or more). In 1998, 22% participants with strong religious convictions reported being sexually active. In 2003, the proportion increased to 29%, while in 2008 it reached 47%. The figures suggest that the lack of association between religiosity and condom use could not be explained by sexual inactivity of religious individuals.

Discussion

In this study we examined the trends and associations between religiosity and young people's sexuality in Croatia in the period 1998-2008. Before discussing our results, several study limitations need to be addressed. Our findings may not be representative of the entire Croatian college population of that age, but are nonetheless relevant for that cohort. Located in the capital city, the University of Zagreb is by far the largest in the country. In academic year 2005/2006, it was attended by 75% of all college students. In addition, the student body is the most heterogeneous – in terms of regional composition – of all Croatian universities. Almost half (45% in 2005/2006) of all students enrolled in the University of Zagreb schools come from other parts of the country. The remaining five universities are primarily of regional importance.

A well-documented negative association between religiosity and education in Croatia (Črpić & Zrinščak, 2005) suggests that our study may have "underestimated" the influence of religion on risky sexual activities among young adults. Religiosity may have more influence

on the sexuality of young people who did not attend college. Furthermore, those who continue their education beyond high-school have above average educated parents, which may be associated with a more liberal family upbringing. The fact that the university is located in the capital city can additionally reduce the impact of religiosity among college population due to an "environmental effect" of highly secularized urban subculture(s). Finally, it should be reemphasized that our operationalization of religiosity did not include indicators of peer religiosity, which may have affected estimations of the impact of religion on students' sexuality.

Overall, the findings point to a significant increase in the prevalence of religious upbringing, as well as in the proportion of sexually experienced participants among Croatian college students in the observed period. In accord with a number of recent studies (Cates, 2001; Santelli, Lindberg, Abma, Sucoff McNeely, & Resnick, 2000; Wellings *et al.*, 2001; Santelli, Morrow, Anderson, & Lindberg, 2006), we found some evidence of increased condom use, but the trend was significant only in the context of first sexual intercourse (for a similar finding from a neighboring country see Klavs, Rodrigues, Wellings, Weiss, & Hayes, 2005).

Our findings suggest that the influence of religiosity on sexuality may be gender-specific. Consistent impact of religious upbringing and religiosity was observed only among female students. This systematic influence, however, was limited to the onset of sexual activity and elementary knowledge of human sexuality. Several other studies found a stronger effect of religiosity among women than men (Meier, 2003; Rizzi, 2004; Rostosky *et al.*, 2004), hinting at a greater susceptibility of female sexuality to socio-cultural influences. This may be particularly relevant in Southeast Europe which is characterized by a strong patriarchal tradition (Halpern, Kaser, & Wagner, 1996).

The negative association between religiosity and basic sexual knowledge is compatible with evidence from other countries (Denissenko, Dalla Zuanna, & Guerra, 1999; Merakou, Costopoulos, Marcopoulou, & Kourea-Kremastinou, 2002). Lesser sexual literacy may either be a consequence of being raised in a strict religious atmosphere, with little or no access to information about sexuality, or it can be a result of a self-imposed ban on consulting sex-related materials that are disapproved of by one's religion. In the latter case, the support from like-minded peers might be required for sustained abstinence of popular culture accounts of sexuality.

As reported in other postindustrial societies (Meier, 2003; Rostosky *et al.*, 2003; Rizzi, 2004), religiosity was shown to delay the onset of sexual activity among female students in Croatia. Bearing in mind, however, that two thirds of (on average) 19-year-old female participants surveyed in 2008 reported the experience of sexual intercourse, the practical significance of this delay – at least in the context of STI/HIV risk reduction – is questionable, or at best unclear. Such conclusion is supported by the lack of a systematic association between religiosity and lifetime number of sexual partners.

In the light of increased importance of religion and religious identification in Croatia (Zrinščak, 2001; Ilišin & Radin, 2007), a limited impact of religiosity on young adults' sexual behavior, particularly regarding condom use and number of sexual partners, may be surprising. The findings are, however, compatible with a type of religious influence on adolescent sexuality, which Regnerus (2007) termed "inconsistent religiosity". He argued that "religious expectations for actions often compete with other preferences and normative expectations" (Regnerus, 2007: 198). This struggle for influence is often intensified by the fact that many of contemporary social institutions, including the educational system and popular media, have undergone a historical process of excluding religious discourse and interests as irrelevant.

In that sense, the absence of the expected behavioral impact of religiosity may reflect two related and competing socio-cultural processes. The first is described by the specific role that religion and the Catholic identity play in young people's lives. Our findings seem consistent with the recent evidence suggesting that religion is an institutionalized confirmation of one's national identity and patriotism, rather than moral guidance, particularly among Croatian youth (Marinović Jerolimov, 2002; Črpić & Zrinščak, 2005). School-based religious education, introduced in the post-war years, helped to fortify this ethno-political function of religious identification (the Serbs, who were perceived as the side that started the 1991-1995 homeland war, are predominantly Orthodox). Religious tradition thus reaffirmed the new national identity by providing (partially mythical) historical continuity. However, this emphasis on the political rather than moral guidance of the Croatian Catholic Church among young people cannot fully account for the lack of a more substantial impact of religiosity on their sexual behavior.

The second process pertains to the impact of popular culture and the role of mass media (Brown, 2002). The process of proliferation of a sexually permissive worldview and related lifestyles helps to explain empirical findings indicating that young religious adults distance themselves from a more traditional Catholicism of their parents (Črpić & Kušar, 1998). As Scott (1998) pointed out, the decline of traditional religious authority is directly related to more sexually permissive attitudes in a number of countries. The burgeoning culture of moral permissiveness (Halman, 1997) is mirrored by an almost universal approval of premarital sexual relations and rising acceptance of homosexuality among younger generations (Marinović Jerolimov, 2002; Štulhofer, Dokmanović, Ajduković, Božičević, & Kufrin, 2005). The main vehicle of the influence of global culture of individualism and sexual permissiveness is popular media. Television was the highest ranked source of sex related information in 1998 (22% of participants reported that TV was their prime source). As a

further illustration, an increase in the reported same-sex sexualized contact among female participants in this study may reflect a rising presence of the media-created and exploited lesbian chic phenomenon (Cottingham, 1996). In this context, the agenda setting and framing roles of the mass media, which has been increasingly preoccupied with sex and sexuality, are essential elements for understanding the contemporary youth sexuality (Brown, 2002). Further research is needed to clarify how the national identity formation and popular media influence Croatian youth's sexuality.

In recent years there have been heated debates about the introduction of sex education in Croatian schools between the advocates of sexual abstinence and a comprehensive sex education curriculum (Bijelić, 2008). No systematic education, however, was introduced to this date. The need for a comprehensive school-based sex education with a strong focus on risk-reducing skills is strongly supported by the fact that the increase in proportion of coitally experienced first-year undergraduates during the 1998-2008 period was not matched by an increase in the prevalence of consistent condom use. Similarly, the proportion of students who reported condom use at last intercourse did not change significantly in the last five years. Combined with recent epidemiological data on STI infections (Marijan *et al.*, 2007), these findings indicate an increased STI/HIV vulnerability in this population and stress the importance of systematic prevention efforts. In that respect, the past decade has been, regrettably, a missed opportunity.

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Table 1. Socio-demographic and socio-sexual characteristics of the 1998-2008 samples by gender.

	1998 (n=1355)		2003 (n=537)		2008 (n=775)	
	F (n=639)	M (n=716)	F (n=285)	M (n=252)	F (n=428)	M (n=347)
	n (%)		n (%)		n (%)	
Age[a]						
18	336	311	99 (34.9)	77 (30.6)	11 (2.6)	13 (3.7)
19	(52.7)	(43.4)	151	136	291	208
≥ 20	257	314	(53.2)	(54.0)	(68.0)	(59.9)
	(40.3)	(43.9)	34 (12.0)	39 (15.5)	126	126
	45 (7.1)	91 (12.7)			(29.4)	(36.3)
Place of residency						
Village	86 (13.6)	74 (10.4)	48 (17.2)	35 (14.0)	78 (18.4)	61 (17.7)
Small town	81 (12.8)	91 (12.8)	50 (17.9)	36 (14.4)	60 (14.2)	43 (12.5)
City	175	211	65 (23.3)	71 (28.4)	116	92 (26.7)
Large city	(27.6)	(29.8)	22 (7.9)	14 (5.6)	(27.4)	26 (7.6)
Metropolitan city (Zagreb)	43 (6.8)	48 (6.8)	94 (33.7)	94 (37.6)	18 (4.2)	122
	249	285			152	(35.5)
	(39.3)	(40.2)			(35.8)	
Mother's education[a,c]						
Primary or less	67 (10.5)	48 (6.8)	24 (8.4)	16 (6.3)	35 (8.3)	19 (5.6)
Secondary	315	351	149	129	236	172
College/university	(49.5)	(49.4)	(52.3)	(51.2)	(55.9)	(50.4)
	254	311	112	107	151	150
	(39.9)	(43.7)	(39.3)	(42.5)	(35.8)	(44.0)
Father's education						
Primary or less	37 (5.8)	28 (3.9)	19 (6.7)	9 (3.6)	28 (6.8)	13 (3.8)
Secondary	263	319	146	119	206	169
College/university	(41.3)	(44.9)	(51.2)	(47.4)	(49.9)	(49.9)
	337	364	120	123	179	157
	(52.9)	(51.2)	(42.1)	(49.0)	(43.3)	(46.3)
Age at first sexual intercourse[a,b,c] *						
	311	279	125	94 (37.3)	144	96 (27.7)
n.a.	(48.7)	(39.0)	(43.9)	8 (3.2)	(33.6)	12 (3.5)
≤ 14	12 (1.9)	27 (3.8)	7 (2.5)	12 (4.8)	12 (2.8)	20 (5.8)
15	25 (3.9)	33 (4.6)	3 (1.1)	36 (14.3)	25 (5.8)	53 (15.3)
16	53 (8.3)	101	33 (11.6)	55 (21.8)	42 (9.8)	85 (24.5)
17	113	(14.1)	56 (19.6)	34 (13.5)	77 (18.0)	65 (18.7)
18	(17.7)	166	43 (15.1)	13 (5.2)	86 (20.1)	16 (4.6)
≥ 19	92 (14.4)	(23.2)	18 (6.3)		42 (9.8)	
	33 (5.2)	92 (12.8)				
		18 (2.5)				
Protection at first sexual intercourse[a,b,c]						
	66 (20.2)	121	20 (12.6)	46 (28.9)	22 (7.8)	47 (18.6)
None	75 (22.9)	(28.0)	19 (11.9)	10 (6.3)	30 (10.6)	17 (6.7)
Withdrawal	173	54 (12.5)	112	95 (59.7)	193	169
Condom	(52.9)	248	(70.4)	5 (3.1)	(68.2)	(66.8)
The pill	9 (2.8)	(57.4)	4 (2.5)	3 (1.9)	10 (3.5)	8 (3.4)
Other	4 (1.2)	6 (1.4)	4 (2.5)		28 (9.9)	12 (7.5)
		3 (0.7)				
Protection at most recent						

intercourse[b,c]		/	/	20 (12.6)	29 (18.6)	42 (14.8)	56 (22.5)
	None	/	/	34 (21.4)	15 (9.6)	37 (13.0)	15 (6.0)
	Withdrawal	/	/	72 (45.3)	98 (62.8)	134	149
	Condom	/	/	28 (17.6)	11 (7.1)	(47.2)	(59.8)
	The pill	/	/	5 (3.1)	3 (1.9)	51 (18.0)	16 (6.4)
	Other					20 (7.0)	13 (5.2)
Number of lifetime sexual partners[a,b,c]		166	120	81 (50.6)	61 (39.9)	120	79 (32.4)
	1	(50.8)	(29.3)	38 (23.8)	31 (20.3)	(42.3)	55 (22.5)
	2	81 (24.8)	94 (22.9)	26 (16.3)	34 (22.2)	75 (26.4)	48 (19.7)
	3-4	60 (18.3)	105	15 (9.4)	27 (17.6)	61 (21.5)	62 (25.4)
	≥ 5	20 (6.1)	(25.6)			28 (9.9)	
			91 (22.2)				
Currently in a relationship[b,c]							
	Yes	/	/	136	80 (32.1)	206	113
	No	/	/	(48.2)	169	(48.2)	(32.9)
				146	(67.9)	221	230
				(51.8)		(51.8)	(67.1)
Experience of same-sex sexual activity[b,c]		41 (6.4)	38 (5.4)	79 (27.8)	35 (14.1)	89 (20.9)	21 (6.1)
	Yes	598	670	205	213	336	322
	No	(93.6)	(94.6)	(72.2)	(85.9)	(79.1)	(93.9)

[a]Gender difference in 1998 significant at .05 or higher; [b]gender difference in 2003 significant at .05 or higher; [c]gender difference in 2008 significant at .05 or higher

n.a. = not applicable (did not have sexual intercourse)

[*]Participants who did not have sexual intercourse were excluded from testing procedure

Table 2. Dynamics of religious upbringing, sexual literacy, and HIV/STI relevant sexual behaviors in the 1998-2008 period.

	1998 (n=1355)[a]	2003 (n=537)[a]	2008 (n=775)[a]
	n (%)		
Religious upbringing**			
No	279 (20.7)	79 (14.8)	99 (12.8)
Yes, but not strict	721 (53.4)	288 (53.8)	442 (57.2)
Yes	349 (25.9)	168 (31.4)	232 (30.0)
Experience of sexual intercourse**			
No	590 (43.5)	219 (40.8)	240 (31.0)
Yes	765 (56.5)	318 (59.2)	535 (69.0)
Condom used at first sexual intercourse*			
No	338 (44.5)	111 (34.9)	145 (28.6)
Yes	421 (55.5)	207 (65.1)	362 (71.4)
Condom used at most recent intercourse			
No	/	145 (46.0)	230 (44.8)
Yes	/	170 (54.0)	283 (55.2)
Consistent condom use			
No	370 (49.0)	155 (49.2)	257 (48.2)
Yes	385 (51.0)	160 (50.8)	276 (51.8)
Number of sexual partners			
1	286 (38.8)	142 (45.4)	199 (37.7)
2	175 (23.7)	69 (22.0)	130 (24.6)
3-4	165 (22.4)	60 (19.2)	109 (20.6)
≥5	111 (15.1)	42 (13.4)	90 (17.0)
	M (SD)		
Age at first sex	16.85 (1.40)	16.99 (1.37)	17.01 (1.52)
Sexual literacy***[b]	5.53 (1.27)	5.49 (1.40)	5.82 (1.45)

*1998-2008 difference significant at .05; **significant at .01; ***significant at .001

[a] Except for the indicators of religious upbringing and sexual literacy, calculations were carried out on a subsample of sexually experienced youth (n_{1998}=765; n_{2003}=318; n_{2008}=535)

[b] 2008≠1998, 2003

Table 3. Correlates of sexual debut in the 1998-2008 period by gender.

	Experience of sexual intercourse					
	1998		2003		2008	
	F (n=488)	M (n=570)	F (n=276)	M (n=247)	F (n=349)	M (n=286)
	OR (95% CI)					
Age	1.51** (1.15-1.98)	1.61*** (1.27-2.03)	1.82** (1.29-2.58)	1.61* (1.11-2.32)	1.59** (1.14-2.21)	1.34 (.97-1.86)
Parents' education	1.03 (.86-1.25)	.95 (.79-1.14)	1.01 (.78-1.30)	1.10 (.83-1.46)	1.03 (.81-1.32)	.62** (.45-.86)
Place of residency						
Village	1.20 (.63-2.30)	1.27 (.67-2.40)	.59 (.27-1.28)	1.13 (.47-2.69)	.76 (.37-1.56)	.46 (.20-1.05)
Small town	.90 (.49-1.65)	.64 (.37-1.12)	.70 (.34-1.48)	.83 (.37-1.87)	.72 (.35-1.49)	.55 (.23-1.36)
City	1.46 (.94-2.26)	1.12 (.75-1.67)	.85 (.45-1.63)	.90 (.48-1.68)	1.10 (.61-2.01)	.81 (.41-1.57)
Metropolitan city (referent)	1	1	1	1	1	1
Sexual literacy	1.56*** (1.32-1.84)	1.25** (1.08-1.44)	1.31** (1.09-1.59)	1.13 (.92-1.38)	1.42*** (1.17-1.74)	.94 (.79-1.11)
Religious upbringing	.63* (.41-.96)	.48*** (.32-.72)	.46** (.26-.82)	.65 (.38-1.13)	.53* (.32-.87)	.81 (.44-1.50)
Religiousness	/	/	/	/	.95* (.90-.99)	.99 (.94-1.04)

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

Table 4. Religiosity and basic knowledge about human sexuality in the 1998-2008 period by gender.

	Index of Sexual Literacy					
	1998		2003		2008	
	F (n=488)	M (n=570)	F (n=276)	M (n=247)	F (n=349)	M (n=286)
	Beta (t)					
Age	-.07 (-1.60)	-.03 (-.77)	.06 (.99)	-.06 (-1.00)	.01 (.28)	-.10 (-1.76)
Parents' education	.04 (.88)	-.01 (-.33)	.02 (.27)	.14* (2.13)	.17** (2.93)	.02 (.34)
Place of residency	.16** (3.39)	.10* (2.27)	.08 (1.32)	-.02 (-.28)	-.003 (-.05)	.02 (32)
Religious upbringing	-.13** (-2.99)	-.13** (-3.17)	-.08 (-1.34)	-.09 (-1.40)	-.14* (-2.35)	-.15* (-2.15)
Religiousness	/	/	/	/	-.13* (-2.07)	-.13 (1.81)
R^2	.06	.03	.02	.03	.09	.07

*p<.05; **p<.01