

# Attitudes Towards Homosexuality in China: Revisiting the Effects of Religion, Internet, Modernizing Factors

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## Abstract

As a marginalised social and cultural phenomenon, homosexuality has gone through a global process of marginalisation and stigmatisation and has gradually gained social acceptance. China has a large number of sexual minorities. Although it has undergone important changes in decriminalisation and de-pathologisation at the legal and medical levels in recent years, implicit discrimination and structural prejudice are still prevalent at the social level. Sexual minorities in China have been facing the dilemma of “visibility deficit” and social marginalisation for a long time. Therefore, an in-depth study of the key factors affecting public attitudes towards homosexuality (acceptance and tolerance) is not only of great academic value for understanding social change in contemporary China but also a practical need to respond to real-life concerns.

Existing research on homosexual attitudes has identified several important influences. International studies have generally emphasised the negative influence of religion (especially Abrahamic monotheism), the positive role of modernisation (e.g., economic development, rising educational levels, and the rise of individualistic and liberal values), and differences in demographic characteristics, such as age and gender. However, when applying these findings to the Chinese context, the findings show complexity and inconsistency. Local research is relatively limited, confined to descriptive analyses of small samples of specific groups (e.g., university students), and there is no clear and consistent understanding of the role of religious factors, especially the influence of the Internet, a new and specially regulated media platform in China. Earlier studies have found positive effects of Internet use; however, more recent research suggests that these effects may

be more complex and may even reinforce rather than weaken prejudice through selective exposure and the censorship of information.

Additionally, the interaction between traditional culture and modernisation factors in the context of Chinese society still requires a more in-depth quantitative examination. The purpose of this study is to conduct a systematic quantitative analysis of the factors influencing current public attitudes toward homosexuality in China using the most recent nationally representative survey data (CGSS 2021). We focus on the role of core variables, including religiosity, Internet use, indicators of modernisation (educational attainment and tendency to liberalise), and traditional cultural perceptions while controlling for key demographic characteristics. By adopting a zero-inflated Poisson regression model that can adequately handle the common skewed distribution of attitudinal data, this study expects to identify trends in how these factors influence attitudes, especially clarifying the complex effects of religion, the Internet, and educational attainment. The study's results aim to fill gaps in the existing literature, deepen understanding of the mechanisms of social attitude change in China, and provide empirical evidence to inform policies and interventions promoting social inclusion for sexual minorities in China.

**Keywords:** Modernisation paradox, Digital media governance, Chinese social change, Attitude formation

## 1 Background

As a marginalised culture, homosexuality is often challenged by mainstream society for its non-heteronormative nature, though it is not completely prohibited. As the country with the most significant sexual minority in the world (Wang et al., 2020), China has gone through a series of changes in its homosexuality-related institutions, with same-sex sexual behaviours often being punished by detention, reeducation through labour, or hooliganism for “sodomy” or “hooliganism” during the early years of the new Chinese state in 1949. In the 1997 Criminal Law, the vague, catch-all offence of “hooliganism” was no longer retained. Consequently, “sodomy” also effectively departed from the purview of criminal law. This is widely regarded as a landmark in the decriminalisation of homosexuality in China. Although homosexuality was removed from the Chinese Classification of Mental Disorders (CCMD) in 2001, there is still implicit discrimination against homosexual behaviour and groups in many other official documents and at the societal level (Wang et al., 2019). In China, where traditional family life still holds a dominant position, a large number of homosexual or bisexual people remain largely closeted. A national cross-sectional survey conducted by the United Nations Development Program (UNDP) in China revealed that nearly one-third of respondents expressed a reluctance to interact with sexual minorities (UNDP, 2016), reflecting significant public resistance to homosexuality. Heteronormative prejudice is pervasive across political, medical, and social spheres in China (Wong, 2015), and this prejudice has led to sexual minorities in China being trapped in a social situation characterised by a “lack of visibility” and marginalisation (Wang et al., 2019). Given the

structural constraints of stigmatisation faced by sexual minorities, systematic research on public attitudes towards homosexuality and social action to promote attitudinal change constitute urgent academic and practical issues that need to be addressed.

## **2 Literature review and research hypothesis**

### **2.1 Religious factors and public attitudes towards same-sex sexual behaviour**

Religious factors are key independent variables in the literature that examine public attitudes toward homosexuality. Historically, Christian definitions of sexuality and marriage have opposed same-sex unions (Adamczyk & Pitt, 2009; Worthen, Lingiardi & Caristo, 2017). A study in Germany showed that the percentage of Christians who were tolerant of same-sex intercourse was significantly lower than other groups (Steffens & Wagner, 2004). Most studies in other countries support this finding (Hayes & Dowds, 2015). Due to the special place of Christianity in American society, American scholars have studied its impact in depth, examining the effects of different Christian denominations, levels of faith devotion, and religious participation. Comparatively, more conservative Christian denominations and more devout religious groups tend to be less inclusive of homosexuality (Adamczyk & Pitt, 2009; Baunach, 2012). In addition to studies of Christian religious beliefs, the acceptance of homosexuality by the Islamic faith has also received much attention. In a survey of nursing university students in Malaysia, it was found that university students who had truly internalised the Islamic faith (intrinsic religiosity) had a low tolerance for homosexuality. Follow-up studies in Australia have shown that religion is consistently a key factor influencing homosexual identity, with greater religious involvement associated with more negative identification with homosexuality (Patrick et al., 2013). The influence of religious factors on homosexual identity is confirmed by numerous Western literature (Jäckle & Wenzelburger, 2015). Both Islamic and Christian believers hold stronger negative attitudes towards homosexuality (Hayes & Dowds, 2015; Roggemans et al., 2015).

Studies on religious attitudes toward same-sex sexual behaviour among Chinese groups present inconsistent findings. On the one hand, some studies have shown that religious factors do not have significant effects in predicting Chinese public attitudes toward same-sex sexual behaviour (Lin & Wang, 2021). This phenomenon may be attributed to the long-term secularisation policies implemented during the Communist Party of China's (CPC) governance, which resulted in the majority of the Chinese population self-identifying as atheists. At the same time, the full development of religion in China has faced significant restrictions (Chau, 2011). On the other hand, religious factors have not been completely decoupled from attitudes towards same-sex sexual behaviour. For example, a study of college students found that the influence of religion indirectly affects attitudes toward same-sex sexual behaviour through the mediating role of traditional values (Lin et al., 2016). In addition, another study noted that although there was no significant difference in attitudes toward same-sex sexual behaviour between Chinese Christians and the general public, the Chinese Muslim community showed more negative attitudes toward same-sex sexual behaviour (Xie &

Peng, 2018). These findings suggest that the influence of religion on the Chinese public's attitudes toward same-sex sexual behaviour is complex and diverse and may be moderated and influenced by multiple factors.

Traditional Chinese religions such as Buddhism and Taoism have shown a higher level of tolerance towards homosexuality compared to the usually negative Abrahamic religious traditions (Larson, 2010; Suen & Chan, 2020). It has been further suggested that Buddhism is more tolerant of homosexuality than the Judeo-Christian tradition (Sweet, 2007). This tolerance is rooted in the Buddhist principle of equality and its understanding of the nature of life. The core teachings of Buddhism suggest that suffering in life stems from the three poisons of greed, anger, and ignorance, and sexual desire is considered a manifestation of greed, thus becoming one of the sources of suffering. However, Buddhism's focus is primarily on the potential negative impacts of sexual desire itself, while the gender or sexual orientation of a sexual partner is considered a secondary issue (Corless, 1998; Yip & Smith, 2020). Notably, little explicit opposition to homosexuality has been found in Buddhist texts (Cheng, 2018; Sujato, 2012; Yip & Smith, 2020). Unlike Christianity, Buddhism has not been a source of social or internalised homophobic negativity (Barnes & Meyer, 2012), instead providing a supportive framework for sexual minorities, emphasising the importance of self-compassion and self-acceptance (Cheng, 2017). In addition, although research addressing homosexual acceptance among non-Abraham religious communities is relatively limited, existing research suggests significant differences in acceptance of homosexuality among Hindu communities (Vanita, 2007), while attitudes among Taoist communities show some ambiguity (Siker, 2007).

Based on the above literature, the following hypotheses are proposed in this paper:

**Hypothesis 1:** Individuals with Christian faith will have more disapproving attitudes towards homosexuality

**Hypothesis 2:** Individuals with Islamic faith will have more disapproving attitudes towards homosexuality.

## 2.2 Impact of Internet use on public attitudes towards same-sex sexual behaviour

Similar to other social and political attitudes, attitudes towards homosexuality (and its behaviour) are not innate but are formed through a process of socialisation (Calzo & Ward, 2009b). This socialisation process can occur in a wide range of social institutions, including the family, school, church, and peer groups. However, with the rapid development of communication technology, the role of the media in mediating socialisation has become increasingly important. This has prompted many scholars to re-examine the role of the media in shaping people's attitudes and beliefs, and several contrasting theoretical explanations have been put forward, such as the nurturing theory (Gerbner et al., 1994; Gerbner, 1998) and the agenda-setting theory (McCombs & Shaw, 1972; McCombs, 2004). Some scholars (Horton & Wohl, 1956; Schiappa, Gregg, and Hewes, 2006) have proposed the "prosocial contact" hypothesis based on Allport's (1954) contact theory, which suggests that equal status, sustained, and non-superficial inter-group contact can reduce majority prejudice against minorities. When individuals do not have the opportunity to meet minorities in person, prosocial interactions

can have the same effect as face-to-face contact in reducing prejudice against minorities. It is important to note that prosocial interaction is not limited to television; it can also occur through radio, magazines and Internet-based social media.

With the popularity of the Internet, the de-stigmatisation of homosexuality continues to advance(Wu et al., 2018). The Internet has accelerated the growth of gay virtual communities, evolving from marginalised to highly popular (Robinson & Martin, 2009). It is not uncommon for celebrity stars to admit homosexuality, and reports and discussions about homosexuality abound in the online world. Therefore, with the popularity of the Internet and the wide dissemination of online information, there is a greater likelihood of homosexuality being more widely accepted. According to statistical findings, the number of Internet users in China has increased significantly, rising from 34.3% in 2010 to 77.5% in 2023. Mobile phone Internet users have reached 1.091 billion, accounting for 99.9% of the total number of Internet users. This phenomenon is likely to have an even greater impact on shifts in same-sex sexuality, as the Internet is one of the few arenas where one can directly access information about same-sex sexuality and LGBTQ-related information. In the media environment controlled by the Chinese authorities, information about LGBTQ-related information is difficult to access through traditional media channels (television, mainstream newspapers, movies, books, radio programs, etc.), and homosexuals are virtually invisible to traditional media audiences. However, in contrast, Chinese homosexuals do find some limited space for self-expression and building virtual communities on the Internet (Li, Holroyd, and Lau, 2010). Based on the fact that cyberspace is characterised by fragmentation, accessibility, affordability, and anonymity, which provides the freedom to discuss LGBTQ+-related topics (Wang et al., 2018; Liu et al., 2020). Therefore, in contrast to the traditional mainstream media, which usually prohibits homophobic topics, the Internet-based not only serves as homosexuality-related self-expression, equal rights advocacy, and community building venues, it also provides its users with a reference group with accepting attitudes towards homosexuality (Wu et al., 2018; Liang et al., 2022). Past research using the China General Social Survey (CGSS) has also shown that Internet use has helped to shape more tolerant attitudes towards same-sex sexuality among the Chinese public (Chi & Hawk, 2016; Lin et al., 2016; Hu & Li, 2019; Xie & Peng, 2018)

However, whether the growth in the size of Internet users in recent years has continued to drive a positive shift in public attitudes towards same-sex sexual behaviour remains open to further research. A recent study found that although the Internet has historically played a key role in shaping pro-LGBTQ+ attitudes among the Chinese public, its impact has diminished over time (Lin & Wang, 2021). The impact of Internet use on public attitudes towards same-sex sexual behaviour is not as direct and “obvious” as in previous studies, especially given the differences in the use of different types of Internet media and the Chinese government’s increasing control over Internet content.

Firstly, in the age of Internet information and social media, the public is not only a passive recipient of information but also an active ‘consumer’ of information based on prior knowledge and an established value system; according to Stroud (2007), most adults tend to choose media outlets that are in line with their preexisting beliefs; in this

case, people with conservative views are less likely to be as tolerant of homosexuality as people with liberal views, especially when exposed to positive images of homosexuals. Conservative viewpoints are less likely to be as tolerant of homosexuality as liberal viewpoints, especially when exposed to positive images of homosexuals. Thus, the causal relationship between Internet use and attitudes may be bidirectional; that is, people may choose only those media channels that are consistent with their beliefs and dispositions (Stroud, 2007). With the increasing diversity of information channels on the Internet, individuals are becoming more selective about the content they access. In the process, viewers' value orientations may be reinforced or challenged by their ability to select media content that meets their needs, especially with the emergence of social media, where information dissemination is highly personalised and group-based (e.g., group news pushes based on the composition of friends with common interests). In this context, selective exposure theory is plausible in explaining current trends in media consumption. At the same time, individuals are likely to be influenced by content if the media content to which they are exposed is not personally relevant; however, they will adopt a highly selective attitude toward content if it is consistent with or contradictory to their personal beliefs or values. Thus, Internet use may reinforce an individual's stereotypes of the gay community.

Second, China's media censorship mechanisms extend beyond traditional media to encompass the censorship of information on the Internet and new media. The Chinese authorities tend to suppress content, including views on gender and sexual orientation, that they deem harmful or contradictory to the overall stability of the country, national renaissance and socialist ethics. ( Sun & Zhao, 2022) Under these circumstances, it is challenging for China's Internet media content environment to generate the "echo chamber" effect common in Western media. Predictably, despite the large user bases of Weibo and WeChat, serious online controversies or discussions of issues are filtered before the majority of Internet users are informed. Chinese social media platforms (e.g., Weibo, WeChat, Zhihu) serve primarily as filtered public discussion environments that are not only monitored by the government but also benefit from their openness primarily to young people who self-identify as gay or already gay-friendly. As a result, Chinese new media have been minimal, though not absent, in fostering positive attitudes related to homosexuality. At the same time, the old dichotomy of categorising China's traditional media and Internet media as "conservative" and "liberal," respectively, no longer applies to the current media environment. As a large number of traditional media outlets have established "integrated media" divisions, traditional media content that was previously subject to strict censorship by the authorities has migrated to the Internet, including short-form videos and commentaries. As a result, the boundaries between traditional media and Internet media are blurring, and the concentration of information in Internet content, which is regulated, censored, and controlled by authorities, is increasing. Indeed, the impact of Internet exposure on attitudes towards same-sex sexuality also depends on the way homosexuality is represented in the media. (Hu & Li, 2019) Over the past decade, the Chinese government has taken strict regulatory measures against the presentation of homosexual content on social media and the Internet, reflecting its complex attitudes towards the LGBTQ+ community. In 2015, the State Administration of Press, Publication,

Radio, Film and Television (SAPPRFT) issued new regulations banning “abnormal sexual relationships”, including homosexual content, from television programs and films(China Television Drama Production Industry Association & China Television Production Committee of the China Alliance of Radio, Film and Television, 2016. In 2021, the government stepped up its crackdown on the image of “feminine men” in the entertainment industry. In 2021, the government intensified its crackdown on the image of “feminine men” in the entertainment industry, calling for a purge of “harmful and vulgar” content, which affected many films and television productions dealing with homosexual themes, as well as their dissemination on the Internet. Terms such as ‘cool kids’ or discussions of LGBTQ+ issues are often monitored and suppressed within the framework of ‘public morality’ laws and socialist core values (Chia, 2019). Public gatherings and pride events also face significant limitations when such discourses shift to offline spaces. In 2021, WeChat (the company operating the platform) deleted dozens of LGBTQ+ public accounts, many of which were associated with Chinese higher education institutions, suggesting heightened government restrictions on the dissemination of LGBT+-related content. (Gan & Xiong, 2021). Due to the government’s unwillingness to educate citizens about same-sex behaviour through official media channels, the public’s general attitude of indifference or disapproval towards homosexuality may be indirectly fostered by social media or the Internet. This implicit ideological steering mechanism may lead the public to believe that homosexuality is a taboo topic, thus creating biased perceptions of sexual minorities in the absence of sufficient objective and antecedent knowledge.

**Hypothesis 3:** Individuals with more frequent use of the Internet will have more disapproving attitudes towards homosexuality.

### **2.3 modernisation theories, traditional culture and attitudes to homosexuality**

Numerous modernisation factors, such as economic development, increased education, and social freedom, have become important lines of research in explaining homosexual inclusion (Adamczyk & Pitt, 2009; Dunbar, Brown, & Amoroso, 1973; Jensen, Gambles, & Olsen, 1988). Having experienced economic development, industrialisation, and modernisation, perceptions, values, and attitudes have shifted from survival and materialistic concerns to higher-level needs, such as quality of life, rights, self-expression, and subjective well-being, which has contributed to greater inclusion regarding sexual diversity. (Inglehart et al. 2002) Adamczyk and Pitt (2009) argue that high-income countries are generally more tolerant of a range of social issues, including homosexuality. However, a direct effect of modernisation and economic development may be the spread of higher education, which at the same time has become an important factor in contributing to tolerant attitudes towards homosexuality (Patrick et al., 2013; Twenge, Sherman, et al., 2015). Education not only promotes citizens’ expression of and support for their rights to self and fosters tolerance but also promotes awareness and logical analysis of new things while advancing understanding and support for post-materialist values, promoting individual liberalising tendencies and embracing the expression of human plurality (Herek, 2009; Ohlander, Batalova, & Treas. 2005)

Data analyses show that the higher the years of education, the higher the level of tolerance for homosexuality. Research based on data from the General Social Survey in the United States suggests that an increase in the overall educational attainment of the public is an important explanatory factor for the de-stigmatisation of homosexuality in recent years (Loftus, 2001). In European and American societies, economic development and industrialisation have also led to the 'liberalisation and 'diversification' of attitudes throughout society. Controlling for objective conditioning variables, an individual's degree of 'liberalisation' is positively correlated with his or her acceptance of homosexuality (Twenge, Carter et al., 2015). Groups with a liberal orientation are generally more "tolerant" of others' sexual orientation (Kuntz et al., 2015). A research study by the Pew Research Center (Pew Research Center, 2019) showed that more educated populations exhibit lower levels of prejudice and stereotyping on sexual orientation. The results of this study reveal how educational level, as an important variable, affects individuals' acceptance and cognitive framing of sexual diversity, providing empirical evidence for understanding the mechanisms of prejudice formation in social cognitive structures and highlighting the potential role of higher education in promoting social inclusion.

In contrast, liberal attitudes are typically associated with higher levels of diversity acceptance and inclusiveness, which extends into the realm of multiple sexual orientations (Hout & Fisher, 2019). Correspondingly, Lammer & Stocker (2011) found a positive association between liberal views of divorce and sexual orientation diversity acceptance. Groups that viewed divorce as a personal right of choice were similarly inclined to accept the existence of diverse sexual orientations. Foster & Haldane (2013) further elaborated that individuals who held a divorce freedom view tended to exhibit a higher willingness to discuss homosexuals and the diverse dimensions of sexual orientation. Additionally, Legege & Kellstedt (2008) explored the broader correlation between liberal views on matters of personal choice and political liberalism. Notably, liberal views on issues such as abortion and the legalisation of prostitution may be associated with higher levels of acceptance of multiple sexual orientations, with liberal values playing a key role in shaping societal attitudes towards sexual diversity.

However, the factor explanation of relevant modernisation has also been questioned, as changes in the series of factors brought about by modernisation and economic development do not explain all changes in attitudes, for example, for developed countries such as Japan and South Korea, which are less tolerant than European and North American countries at the same level of economic development and level of national education, with the key factor being cultural traditions that are independent of the modernisation factor (Smith, 2011). In statistics based on a sample of 494 Chinese university students, it was also found that university students with strong traditional Confucianism (filial piety and following parents' wishes) were less tolerant of homosexuality (Lin et al., 2016). Those who follow traditional Confucianism tend to obey authority, attach great importance to family and society, tend to maintain the status quo, reject new things, and do not readily accept people with non-traditional thoughts or behaviour (Feng et al., 2012), which to some extent reduces tolerance of homosexuality. At the same time, Confucian values have traditional gender role values and established social responsibilities and role assignments, as well as a complete

definition of the integrity of the family (the family is an important foundation for everyone to play a social role, and homosexuals are unable to have children, so the family structure cannot be complete), and therefore homosexual behaviour challenges the relevant moral values to a certain extent.

In addition to this, specific demographic factors explain differences in attitudes towards homosexuality, such as gender and age. Women are more accepting of same-sex sexual behaviour than men (Baunach, 2012). Analyses based on data from places such as Germany also reveal that women are more understanding of same-sex marriage (Steffens & Wagner, 2004). Moreover, the results of the American Sexual Attitudes Survey of the 1970s showed that younger adults were more accepting of homosexual behaviour (Glenn & Weaver, 1979). Generational differences in the social attitudes of adults at different birth stages are evident. Young people born after eighty years are becoming more tolerant of various controversial issues such as atheism, homosexuality, and public spaces that support marginalised groups. Of all the controversial issues selected by the researcher, the most significant generational differences were directed towards homosexuality (Twenge, Carter, & Campbell, 2015).

Based on the above discussion, this paper proposes the following three hypotheses:

**Hypothesis 4:** There is a positive correlation between the level of education of the public and their attitudes towards same-sex sexual behaviour, i.e. the higher the level of education, the higher the approval of same-sex sexual behaviour.

**Hypothesis 5:** There is a significant positive correlation between the level of liberalisation tendency of the public and their attitudes towards same-sex sexual behaviour, i.e. the more liberalised individuals are, the higher their approval of same-sex sexual behaviour.

**Hypothesis 6:** There is a negative correlation between public support for traditional culture and their attitude towards same-sex sexual behaviour, i.e., the higher the level of identification with traditional culture, the lower the approval towards same-sex sexual behaviour.

### 3 Data and methodology

This study aims to deepen the general understanding of attitudes towards homosexuality in contemporary Chinese society, to examine the influence of the Internet, religion, and modernisation factors in the context of Chinese society, and to reveal trends in the factors influencing attitudes towards homosexuality in recent years. For this purpose, we used data from the CGSS national sample. The CGSS is a multistage stratified survey of urban and rural households in China, conducted annually or biennially to collect longitudinal data on changes in social structure, values, norms, and quality of life, which are of theoretical and practical relevance to Chinese research. In this survey, face-to-face interviews were used to collect information from respondents. Additionally, the CGSS data are open-access, enabling scholars to conduct comparative studies. Starting in 2013, a question was added to the questionnaire to collect information on attitudes towards homosexual behaviour, which made it possible to systematically analyse the factors influencing public attitudes towards homosexuality in China and to explore their trends over time.

## **Dependent Variable**

The key outcome variable in this study was attitudes towards homosexuality, as measured by a simple question: “you think same-sex sexual behaviour is right or wrong?” Responses to this question were initially coded in the questionnaire as 1, 2, 3, 4, and 5, where 1 means “always wrong” and 5 means “totally right”. The frequency distribution of responses for each category is shown in Table 1. Respondents who chose “always wrong” accounted for 68.94 % of the total observations. Due to the distribution of responses, neither standard (Poisson) Poisson regression nor negative binomial regression is appropriate. Therefore, a zero-inflated model, which is widely used in medical, financial, insurance, and sociological research (Greene, 1994; Lambert, 1992), was used. Accordingly, the responses were re-encoded as 0, 1, 2, 3, and 4, where 0 means “always wrong”, 1 means “mostly wrong”, 2 means “hard to tell right from wrong”, 3 means “sometimes right” and 4 means “always right”. The higher the number, the greater the tolerance of homosexuality.

## **Independent Variable**

With the widespread application of Internet technology and its deep penetration into daily life, people’s exposure to and reliance on Internet information has gradually increased. According to CGSS data, 59.12% of respondents indicated that the Internet has become the primary source of personal information. In this study, we classified the degree of exposure to Internet information into three categories: (a) rarely, (b) sometimes, and (c) often by asking the question, “In the past year, to what extent have you used Internet media”.

Religion is measured using a series of binary variables: Christianity (including Catholicism, Protestantism, Orthodox Christianity, and other Christian-related faiths), Islam, Buddhism and Taoism, which are common in Chinese society. The modernisation factor was measured using three independent variables: (1) level of education, (2) degree of liberal inclination, and (3) attitudes towards traditional culture. Depending on the number of years of schooling at different levels of education, we re-encoded respondents’ answers to the question “What is the highest level of education you have achieved?” The responses were re-encoded into the numerical variable of years of education. That is, no education = 0 years, primary schools = 6 years, middle school = 9 years, high school/secondary school = 12 years, and college and beyond = 16 years. For liberal tendency, this study measured it through attitudes towards premarital sex. In traditional Chinese culture and morality, maintaining chastity before marriage is essential, and there is a clear opposition to premarital sex. However, libertarians see it as part of individual freedom and private choice and tend not to be morally critical or negative about it. According to the question “Do you approve of premarital sex?” we grouped the answers into three categories: (a) oppose, (b) neither approve nor oppose, and (c) approve, with the higher tolerance of premarital sex, the more pronounced the liberal tendency. Attitudes towards traditional culture, on the other hand, were measured by approval of the traditional gender division of labour. Traditional Chinese Confucianism emphasises social order and moral norms, with the

gender division of labour being particularly prominent, where “men dominate the outside world, and women dominate the inside world” In contrast, modern concepts of gender equality emphasise a breakthrough in the traditional distribution of gender responsibilities and roles. In the survey, respondents were asked to rate their level of agreement with the following statement: “Men should focus on their careers, while women should focus on their families.” We categorised their attitudes as (a) disagree, (b) neither agree nor disagree, and (c) agree.

### control variable

As mentioned above, demographic characteristics, such as age, gender, household status (hukou), and income, were included as control variables in our study. In order to capture the effect of the period on attitudes towards homosexuality, we included six birth cohort dummy variables to indicate the decade in which the respondent was born rather than using a linear measure of age. Respondents born before 1949, our oldest cohort, were the reference group. Gender is measured as a dichotomous variable, where male = 0 and female = 1. Household status is dichotomous, with rural = 0 and urban = 1. Income is measured as the logarithmic form of household income. Table 1 gives descriptive statistics for all independent and control variables included in the analysis.

### Methodology

The survey data showed that 68.94 % of the respondents chose the option “always wrong = 0”, resulting in a skewed and zero-inflated probability distribution. Due to the skewed distribution of the dependent variable, which included too many zeros in the count data, we employed a zero-inflated Poisson (ZIP) regression model. In many studies of real-life events and public attitudes, it is common to observe that the count data of the study subjects contain a large proportion of zero-valued observations, e.g., insurance claims, school dropouts, divorces, and abortions. The very high probability of zero-valued observations in count data can lead to over-dispersion, more commonly known as the zero-inflation problem. Ordinary count regression models are not suitable for analysing count data with an excessive number of zeros. The ZIP model is a statistical model based on a zero-inflated probability distribution in which excess zeros are generated by two potentially independent processes (Greene, 1994; Lambert, 1992). The first part is controlled by a binary distribution (Bernoulli distribution), which generates structural zeros (or extra zeros).

The second part is controlled by the Poisson distribution, which produces counts, some of which may be true zeros. For example, since a large proportion of respondents chose “always wrong = 0” in response to a question about attitudes towards homosexuality, these respondents can be divided into two groups. One group, Group A, consists of people who grew up in homophobic homes or who have harassed homosexuals and who have clear and strong attitudes against homosexuality. The other group, Group B, consists of people who grew up in families with ambivalent attitudes towards homosexuality and who may be influenced by factors that make them less accepting of homosexuality. These two groups chose the “zero” option for different reasons. However, whether the respondents belonged to Group A or Group B was unknown

during the survey. Therefore, the data can be considered as a mixture of an all-zero dataset and a scenario-specific Poisson-distributed count dataset. Several variables will be used to estimate whether confident respondents belong to group A through binary logistic regression. The Group B dataset can then be obtained by excluding Group A observations. Finally, a Poisson count model can be applied to the Group B count data. In other words, the logit model estimates the effect of a particular variable on the probability of some event occurring or not occurring. The Poisson count model is used to estimate the effect of a variable on the expected number of events. In this mixed model, the distribution function is as follows:

$$\begin{aligned}\Pr(y_j = 0) &= \pi + (1 - \pi)e^{-\lambda} \\ \Pr(y_j = h_i) &= (1 - \pi) \frac{\lambda^{h_i} e^{-\lambda}}{h_i!}, \quad h_i \geq 1\end{aligned}$$

where  $\pi$  denotes the probability of structural zeros and obeys a Poisson distribution in the second part, accordingly, the ZIP regression is divided into two parts: the logit model and the Poisson count model. In the first part, a binary logistic regression (the zero-inflated part) is used to test the effect of a specific variable on the probability that the dependent variable (attitude towards homosexuality) is a structural zero. The negative coefficients in this part indicate that an increase in the absolute value of the coefficients decreases the probability that the dependent variable is an additional zero. The second part presents the regression results as coefficients or incident rate ratios (IRRs) for the reference group, which are equivalent to a standard Poisson count model.

## 4 Results of data analysis

Table 2 reveals the role of the explanatory variables of this study in influencing attitudes towards homosexuality. Model 1 contains four control variables: gender, age, household status and income. Results indicate that women's acceptance of homosexuality is significantly higher than that of men. This potentially reflects greater empathy from women towards homosexual individuals. In the context of China's traditionally male-dominated culture, it is plausible that women, who may also experience societal disadvantages, can more readily empathise with another group facing marginalisation. As we previously anticipated, younger individuals exhibit greater tolerance towards homosexuality than older individuals. This was particularly evident in the post-millennial birth cohort, for whom the odds of holding accepting attitudes towards homosexuality were 2.152 times higher than for older cohorts ( $\beta=0.766$ ,  $p<0.001$ ). In contrast, the role of household registration and income in influencing homosexual attitudes was not significant.

Model 2 incorporates three variables that measure modernisation factors—level of education, liberal leanings, and attitudes towards traditional culture—into the analytical model. Analysis of the data showed that liberal-leaning individuals with higher tolerance for premarital sex were more accepting of homosexuality: those who

endorsed premarital sex had 2.412 times higher expectations of homosexual attitudes than those who opposed it ( $\beta=0.881$ ,  $p<0.001$ ), supporting the research hypothesis that the individual's degree of liberalisation is positively related to their acceptance of homosexuality, the research hypothesis. Belief in Confucianism significantly reduced tolerance of homosexuality: individuals who endorsed the traditional division of labour had 15.60% lower expectations of homosexual attitudes compared to those who did not endorse the traditional division of labour ( $\beta=-0.169$ ,  $p <0.001$ ). However, inconsistent with our presupposition, the increase in years of education showed a significant adverse effect in the counting model. We suggest that this may be because the effect of education level on attitudes is, in fact, more complex than a simple linear relationship. Indeed, in terms of the marginal interaction effect of education level on the expectations of the dependent variable (Figure 3), the effect of education presents a non-linear relationship. The effect of education on attitudes is more complex, involving different levels and groups of people, and is statistically significant and potentially harmful due to the high proportion of individuals with lower and middle literacy levels.

To further test the influence of education, we added the above years of education as a zero-inflated factor to Model 3 to test whether this variable determines the observed counts as a structural zero. The results showed a significant effect of education level in the zero-inflated model: the likelihood of believing that homosexuality is "always wrong" decreased significantly with increasing years of education, with the likelihood of resisting or denying homosexuality decreasing by 10.8% for each additional year of education ( $\beta = -0.114$ ,  $p <0.001$ ).

In Model 3, a count model, we incorporated internet use frequency to examine the impact of internet exposure on the acceptance of homosexuality. As hypothesised, rather than leading to a clear increase in acceptance, internet use demonstrated a statistically significant negative influence. The predicted level of acceptance towards homosexuality for frequent internet users was 12.7% lower than for non-users ( $\beta=-0.136$ ,  $p<0.05$ ). Given the complexity of the Internet factor's influence, we incorporated the frequency of Internet use into a zero-inflated model in Model 4. It is worth noting that in Model 4, education level and Internet exposure showed significant inverse effects in both the count and zero-inflated models. Specifically, for the homophobic group in the zero-inflated model, more education and more exposure to the Internet significantly reduced their opposition to homosexuality, but for those with ambiguous attitudes in the count model, more education and more frequent Internet use instead reduced their acceptance of homosexuality. To some extent, the effects of education level and the Internet on attitudes towards homosexuality show a divergent effect across groups, with the Internet only weakening the homophobic group's opposition.

To explain this differentiation effect in more depth, we include the interaction term between Internet use and years of schooling in the counting model of Model 5. The data show a significant interaction effect between the Internet and years of education ( $\beta=0.050$ ,  $p<0.001$ ), demonstrating that the effect of Internet information exposure on the expectations of the dependent variable varies significantly across literacy groups. Specifically, as shown in Figure 1, as the level of Internet use rises, it is clear that for

those in university and above, there is an increase in their inclusiveness towards same-sex sexual behaviour. However, for those in primary school and below, the more they use the Internet, the more their acceptance of homosexuality decreases significantly.

Models 4 and 5 included a measured variable for religion in the count and zero-inflated models, respectively, but inconsistent with the results of related studies in other developed countries, neither Christianity nor Islam significantly reduced acceptance of homosexuality. Additionally, we examined the marginal interaction effects of generations on the expectations of the dependent variable, as per Model 5 (Figure 2). Controlling for the effects of other factors, younger generations still steadily showed higher acceptance of homosexuality, with the predicted values of attitudes towards homosexuality in the post-reform and opening up cohorts, i.e., those born after 1980, 1990, and 2000, increasing more significantly than the attitudes in the other birth cohorts Predicted values increased more markedly.

## 5 Conclusion and discussion

First, inconsistent with Western studies, religious factors did not show a significant effect in predicting the Chinese public's attitudes toward same-sex sexual behaviour. There were no significant differences in attitudes towards same-sex sexual behaviour between followers of either Christianity, Islam, Buddhism or traditional Chinese Taoism and the general public. Studies in China further weaken the adverse effect of Islam on attitudes towards homosexuality. We believe this is the case for three main reasons: First, the secularisation policy pursued over a long period during the rule of the Communist Party of China (CPC) has led to the majority of the Chinese population self-identifying as atheists, with 92.5% of those who explicitly stated that they did not believe in religion in the CGSS2021 survey data. (United Front Work Department of the CPC Central Committee, 2023) Second, China's current religious policy actively guides religions to adapt to a socialist society, promotes the Sinicisation of religions, promotes the secularisation of religions at the state level, strengthens believers' identification with the state and the Chinese nation, and promotes the adaptation of traditional beliefs, doctrines and religious rules to the requirements of social development in contemporary China. The influence of secular life has weakened the binding power of traditional doctrines and dogmas. According to the CGSS2021 survey, 45% of respondents who reported having religious beliefs participated in religious activities less than once a year, and 37.64% of religious believers have never participated in any religious activities. Third, China's Muslim community is mainly composed of more than 10 ethnic minorities, including Hui and Uyghur, and Islamic civilisation has been introduced to China since the Tang Dynasty and has become an important part of China's traditional culture in the long process of historical development, and the current staggered settlement pattern of "large mixed dwellings and small clusters" further promotes the integration of Muslims with other ethnic groups, such as Han Chinese. Some scholars have noted that religious beliefs have a profound impact on Chinese culture. Some scholars have pointed out that religious belief has an important impact on ethnic identity but does not play a decisive or critical role (Ding Mingjun, 2013; Bai Shouyi, 2001), and the CGSS2021 survey shows that only 10 per cent of

respondents who believe in Islam take part in weekly religious activities, while 52.14 per cent of respondents who claimed to believe in Islam said that they had never taken part in any religious activities and that the influence of secularised life has led them to take part in religious activities every week. The influence of secularised life has made them more inclusive in their thinking.

Second, Internet use showed significant heterogeneity of effects across groups. For individuals with attitudinal ambivalence (i.e., those who do not hold “completely wrong” attitudes), this study found that Internet use inhibited their acceptance. This phenomenon may be attributed to the following mechanisms. Firstly, the lower education level of the sample (32.7% of those with primary education or less) makes them more susceptible to the selective exposure effect. This group was more likely to be exposed to a biased conservative information environment delivered by Internet messages and social media. Media algorithms and carefully curated online content can reinforce an individual’s preexisting tendencies by passively presenting messages that align with their existing attitudes (Feldman et al., 2014). This cumulative reinforcing effect on conservative views has been confirmed by research suggesting that selective exposure processes enhance the accessibility of preexisting attitudes, particularly in media content environments with a strong ideological bias (Shin & Thorson, 2017). Within the internet arena, algorithmic passive pushing of information that reinforces conservative attitudes has had a cumulative effect on the established perceptions of this group. Secondly, the government’s increasingly conservative implicit ideological guidance mechanism also contributes to the conservatism of the Internet information field, which in turn exacerbates the selective exposure effect. For example, in 2017, the China Network Audiovisual Programme Service Association adopted the General Rules for Auditing the Contents of Network Audiovisual Programmes, which defines homosexuality as “abnormal sexual relations and sexual behaviours” and classifies it as “rendering obscenity, pornography and vulgarity and low taste”, showing a strict control over the dissemination of related content. This shows the strict regulation of the dissemination of related content. Some studies have also noted that gender issues may be seen as an area that can be exploited by external forces for ‘ideological subversion’, such as ‘weakening the cohesion of socialist culture’ through support for the rights of sexual minorities (Hong Xiaonan & Zhai Siyu, 2024; Liu, Jianwei & Li Lei, 2019).

Individuals with higher levels of education, in contrast, usually have a stronger ability to screen, analyse and integrate information. They are better able to critically assess the credibility and context of information, thereby mitigating the potential adverse effects to some extent. This group’s exposure to a broader range of diverse content helps promote a more objective perception of homosexuality, reduces the likelihood of being influenced by stigmatising messages, and highlights the importance of a diverse media information environment. The moderating role of cognitive and evaluative skills in the interpretation of information has also been demonstrated by empirical studies showing that exposure to diverse and even contradictory information helps individuals to develop a more balanced perspective (Becker & Scheufele, 2011; Knobloch-Westerwick, 2012).

It is worth noting that the empirical results of this study also reveal that the multifaceted information environment of the Internet may induce a certain degree of liberalisation for individuals with extreme exclusionary attitudes (i.e., choosing the 'completely wrong' option). Exposure to counter-narratives, including the presentation of homosexuality in Internet content and social media, may constitute a form of 'indirect immunity' against their entrenched prejudices (Ho et al., 2012). In this context, the dynamics of selective exposure and counterinformation can help to dissolve their rigidly negative attitudes gradually. It has been demonstrated that prosocial interactions and media debates can influence public perceptions of homosexual behaviour (Ho et al., 2012), while online content can challenge rigid cognitive structures in strongly non-inclusive groups (Janssen & Scheepers, 2018). Correspondingly, more literate groups, with their own information screening and identification skills, are more receptive to multiple sources, diverse and inclusive information and perspectives, and with selective exposure reinforcing relevant effects, are more objective in their perceptions and judgements related to homosexuality, and are less likely to be affected by stigmatising information. For individuals with staunchly non-inclusive views, the media have a liberalising effect on their attitudes, and the mixing of multiple types of information on the Internet may have an impact on the attitudes of this group, causing them to waver from their inherently stubborn ideas. (Ying Xie & Minggang Peng, 2018). In addition, this paper verifies that education level and liberalisation tendency are positively associated with their attitudes towards same-sex sexuality, i.e. the higher the education level, the higher the approval of same-sex sexuality. The level of support for traditional culture is negatively associated with its attitude towards same-sex sexual behaviour. Younger generations will have higher tolerance.

In summary, this study systematically quantifies the multiple influences on social attitudes towards homosexuality in contemporary China. It provides insights into the multiple factors and their interactive effects that affect public acceptance of homosexuality. The findings go beyond simple linear judgements to reveal the lack of significant religious influence, the double-edged sword effect of Internet use (which varies by education level and may weaken extreme exclusionary attitudes), and the tensions within the modernisation factors (e.g., the non-linear role of education). In terms of academic contributions, this study not only offers a unique case from China in the field of social attitudes research but also provides new insights into the influences of religion and media, in particular. In terms of practical concerns, this study accurately portrays the complex picture of the current Chinese society on this topic - with significant intergenerational progress and modernisation drivers, as well as deep-rooted prejudices and the potential risk of entrenchment in the information environment. A deeper understanding of these nuances is crucial for developing effective social communication strategies, promoting rational dialogue in the public sphere, and, ultimately, moving towards a more inclusive society that accommodates sexual and gender diversity.

Future research can further deepen its understanding in the following aspects: First, using longitudinal data (Panel Data) to track the trajectory of individual attitudes and, more precisely, clarify the causal relationship between Internet use, educational experience, and attitude change. Second, we refine the measurement of Internet use to distinguish the differential impact of different platforms (e.g., social media, news

portals, short videos) and contents (e.g., entertainment, news, social interactions, and discussions on specific topics) and combine content analysis with digital trace data to explore how the specific content of information exposure shapes attitudes. Third, the micro-mechanisms of attitude formation will be explored in depth, e.g., through experimental methods or in-depth interviews, to reveal how education, media exposure, social interactions, and other factors specifically affect individuals' cognitive frameworks, affective responses, and value judgements.

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## 7 Tables

**Table 1: Descriptive Statistics of All Variables**

*Note: The table presents descriptive statistics for all variables included in the analysis. Percentages are calculated based on valid responses. SD represents standard deviation.*

Variables	Frequencies	%	Mean	SD
<b>Attitudes towards Homosexuality</b>				
Always wrong (=0)	5,252	68.94		
Mostly wrong (=1)	469	6.16		
Hard to tell right or wrong (=2)	1,411	18.52	0.645	1.055
Sometimes right (=3)	321	4.21		
Always right (=4)	165	2.17		
<b>Gender</b>				
Male (=1)	3,679	45.15		
Female (=0)	4,469	54.85		
<b>Birth Cohort</b>				
Before 1949 (=0)	1,089	13.37		
1950-1959 (=1)	1,610	19.76		
1960-1969 (=2)	1,661	20.39		
1970-1979 (=3)	1,278	15.68		
1980-1989 (=4)	1,171	14.37		
1990-2000 (=5)	929	11.40		
≥2000 (=6)	410	5.03		
<b>Household Registration Status</b>				
Rural <i>hukou</i> (=0)	4,842	60.11		
Urban <i>hukou</i> (=1)	3,213	39.89		
<b>Educational Level</b>				
No formal education	905	11.14		
Elementary school	1,751	21.55		
Junior high school	2,311	28.44		
Senior high school/technical secondary	1,489	18.32		
Junior college diploma and above	1,671	20.56		
<b>Years of Education</b>		9.31	0.05	
<i>Religious Beliefs</i>				
<b>Christian Beliefs</b>				
No (=0)	8,012	98.33		
Yes (=1)	136	1.67		
<b>Islam Beliefs</b>				
No (=0)	8,008	98.28		
Yes (=1)	140	1.72		
<b>Buddhist Beliefs</b>				
No (=0)	7,863	96.50		
Yes (=1)	285	3.50		
<b>Taoist Beliefs</b>				
No (=0)	8,109	99.52		
Yes (=1)	39	0.48		
<b>Internet Information Exposure</b>				
Rarely use the internet	2,801	34.41		

<b>Variables</b>	<b>Frequencies</b>	<b>%</b>	<b>Mean</b>	<b>SD</b>
Sometimes use the internet	618	7.59		
Frequently use the internet	4,722	58.00		
<b>Endorsement of Premarital Sex</b>				
Disagree (=0)	4,580	58.77		
Neither agree nor disagree (=1)	2,021	25.93		
Agree (=2)	1,192	15.30		
<b>Endorsement of Gender Division of Labour in Traditional Culture "Men should focus on career, while women should focus on family"</b>				
Disagree (=0)	3,121	38.63		
Neither agree nor disagree (=1)	874	10.82		
Agree (=2)	4,084	50.55		

**Table 2:** Zero-inflated Poisson Regression Models Predicting Attitudes Towards Homosexuality.Note: \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ ; Standard errors in parentheses.  $\beta$  = (standard error); IRR =  $(e^\beta)$ .

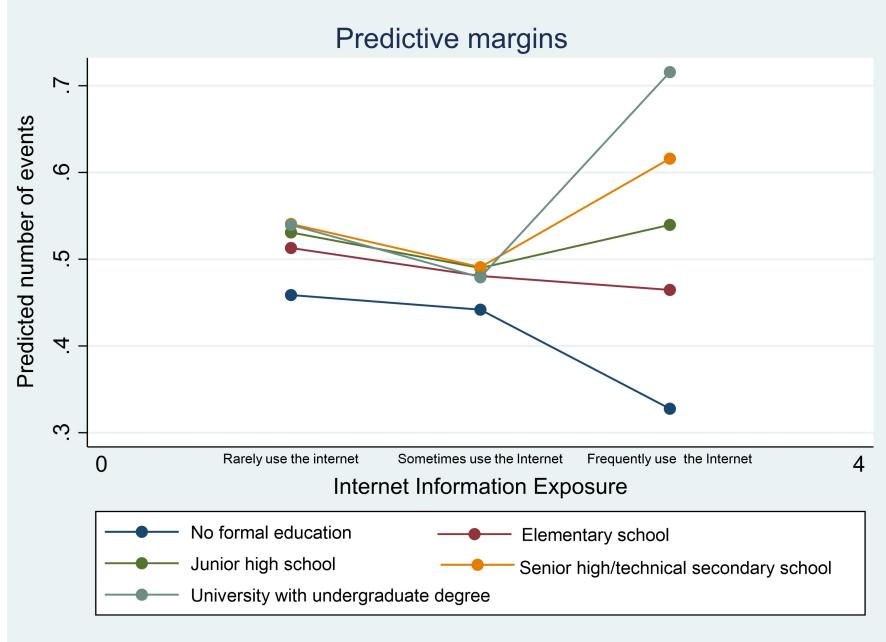
Variables	Model 1		Model 2		Model 3		Model 4		Model 5	
	$\beta$	IRR	$\beta$	IRR	$\beta$	IRR	$\beta$	IRR	$\beta$	IRR
<b>Gender (Reference Group = Female)</b>										
Male	-0.124** (0.040)	0.883** (0.041)	-0.174*** (0.041)	0.841*** (0.041)	-0.210*** (0.041)	0.811*** (0.041)	-0.211*** (0.041)	0.809*** (0.041)	-0.193*** (0.041)	0.824*** (0.041)
<b>Birth Cohort (Ref = Before 1949)</b>										
1950-1959	0.100 (0.102)	1.105 (0.106)	0.022 (0.098)	1.022 (0.098)	0.010 (0.098)	1.010 (0.098)	-0.006 (0.098)	0.994 (0.098)	0.023 (0.097)	1.023 (0.097)
1960-1969	0.0558 (0.100)	1.057 (0.097)	-0.057 (0.097)	0.945 (0.097)	-0.064 (0.097)	0.938 (0.097)	-0.076 (0.099)	0.927 (0.099)	-0.035 (0.099)	0.966 (0.099)
1970-1979	0.275** (0.098)	1.316** (0.096)	0.116 (0.096)	1.123 (0.102)	0.118 (0.102)	1.125 (0.102)	0.111 (0.102)	1.117 (0.102)	0.135 (0.101)	1.145 (0.101)
1980-1989	0.419*** (0.097)	1.521*** (0.099)	0.185 (0.099)	1.203 (0.105)	0.194 (0.105)	1.215 (0.105)	0.191 (0.105)	1.211 (0.105)	0.213* (0.104)	1.237* (0.104)
1990-2000	0.650*** (0.095)	1.916*** (0.101)	0.360*** (0.101)	1.434*** (0.107)	0.412*** (0.107)	1.509*** (0.106)	0.416*** (0.106)	1.516*** (0.106)	0.418*** (0.106)	1.519*** (0.106)
$\geq 2000$	0.650*** (0.095)	2.152*** (0.109)	0.553*** (0.109)	1.739*** (0.114)	0.592*** (0.114)	1.808*** (0.114)	0.596*** (0.114)	1.814*** (0.114)	0.606*** (0.114)	1.833*** (0.114)
<b>Income</b>										
	0.008 (0.019)	1.008 (0.019)	-0.014 (0.019)	0.986 (0.019)	-0.014 (0.019)	0.986 (0.019)	-0.010 (0.019)	0.991 (0.019)	-0.016 (0.020)	0.984 (0.020)
<b>Household Registration Status (Reference Group = Rural Hukou)</b>										
Urban Hukou	0.0354 (0.041)	1.036 (0.043)	-0.029 (0.043)	0.971 (0.043)	-0.025 (0.043)	0.976 (0.044)	-0.015 (0.044)	0.985 (0.044)	-0.020 (0.044)	0.980 (0.044)

Variables	Model 1		Model 2		Model 3		Model 4		Model 5	
	$\beta$	IRR	$\beta$	IRR	$\beta$	IRR	$\beta$	IRR	$\beta$	IRR
<b>Years of Education</b>										
			0.001	1.001	-0.019***	0.981***	-0.012*	0.988*	-0.046***	0.955***
			(0.006)		(0.006)		(0.006)		(0.011)	
<b>Endorsement of Premarital Sex (Ref = Disagree)</b>										
Neither agree nor disagree			0.662***	1.938***	0.590***	1.804***	0.568***	1.765***	0.570***	1.768***
			(0.052)		(0.052)		(0.052)		(0.052)	
Agree			0.881***	2.412***	0.821***	2.272***	0.801***	2.229***	0.789***	2.202***
			(0.056)		(0.056)		(0.056)		(0.056)	
<b>Endorsement of Gender Division of Labor (Ref = Disagree)</b>										
Neither agree nor disagree			-0.096	0.909	-0.109	0.896	-0.113	0.893	-0.111	0.895
			(0.062)		(0.062)		(0.062)		(0.062)	
Agree			-0.169**	0.844**	-0.183***	0.833***	-0.204***	0.815***	-0.212***	0.809***
			(0.052)		(0.052)		(0.052)		(0.053)	
<b>Internet Information Exposure (Reference Group = Rarely use the internet))</b>										
Sometimes use the Internet					-0.185	0.831	-0.242*	0.785*	-0.201	0.818
					(0.096)		(0.114)		(0.177)	
Frequently use the Internet					-0.136*	0.873*	-0.340***	0.712***	-0.717***	0.488***
					(0.067)		(0.079)		(0.118)	

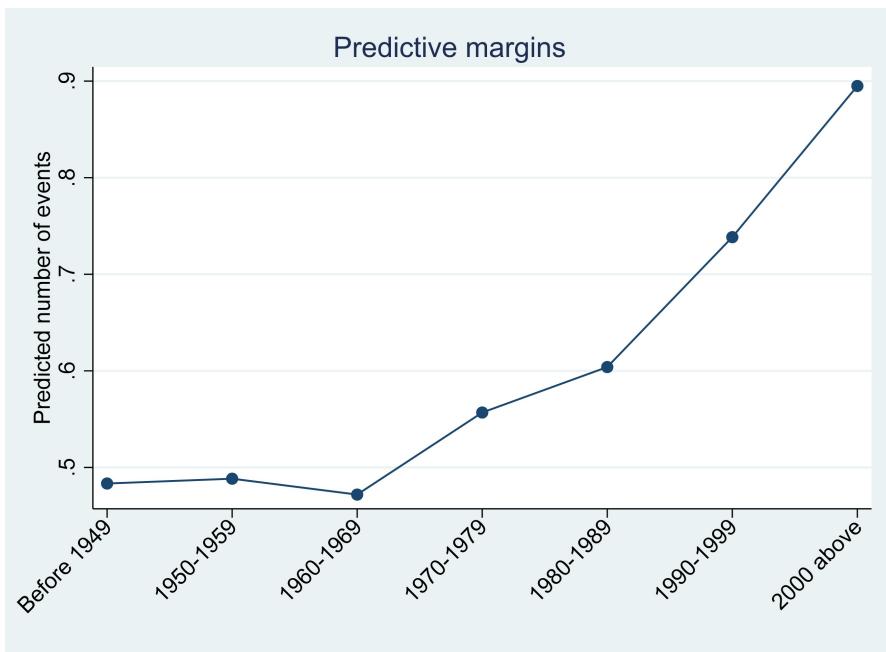
Variables	Model 1		Model 2		Model 3		Model 4		Model 5	
	$\beta$	IRR	$\beta$	IRR	$\beta$	IRR	$\beta$	IRR	$\beta$	IRR
<b>Religion (Reference Group = No)</b>										
Christian					-0.007	0.993	0.100	1.106		
					(0.180)		(0.196)			
Islamic					-0.038	0.963	-0.110	1.010		
					(0.161)		(0.136)			
Buddhist					-0.139	0.870	0.010	0.896		
					(0.115)		(0.185)			
Taoist					0.151	1.163				
					(0.278)		(0.302)			
<b>Interaction Effects between Internet Information Exposure and Years of Education (Reference Group = Rarely use the internet * Years of Education)</b>										
Sometimes use the Internet $\times$ Years of Education							0.001	1.001		
							(0.021)			
Frequently use the Internet $\times$ Years of Education							0.050***	1.051***		
							(0.012)			
<b>Zero Inflation</b>										
Years of Education	-0.114***	0.892***	-0.089***	0.902***	-0.085***	0.919***	-0.088***	0.919***		0.916***
	(0.00871)		(0.0106)		(0.011)		(0.011)			

Variables	Model 1		Model 2		Model 3		Model 4		Model 5	
	$\beta$	IRR	$\beta$	IRR	$\beta$	IRR	$\beta$	IRR	$\beta$	IRR
<b>Internet Information Exposure (Reference Group = Rarely use the internet)</b>										
Internet (Sometimes)					-0.174	0.841	-0.180	0.835		
					(0.187)		(0.196)			
Internet (Frequently)					-0.568***	0.567***	-0.521***	0.594***		
					(0.121)		(0.129)			
<b>Religion (Reference Group = No)</b>										
Christian							0.388	1.474		
							(0.353)			
Islamic							0.032	1.157		
							(0.263)			
Buddhist							0.146	1.033		
							(0.334)			
Taoist							0.0550	1.057		
							(0.606)			
<b>Constant</b>	0.342***		0.0307		1.261***		1.356***		1.314***	
	(0.042)		(0.053)		(0.098)		(0.102)		(0.103)	
<b>Observations (N)</b>	5778		5682		5678		5678		5678	

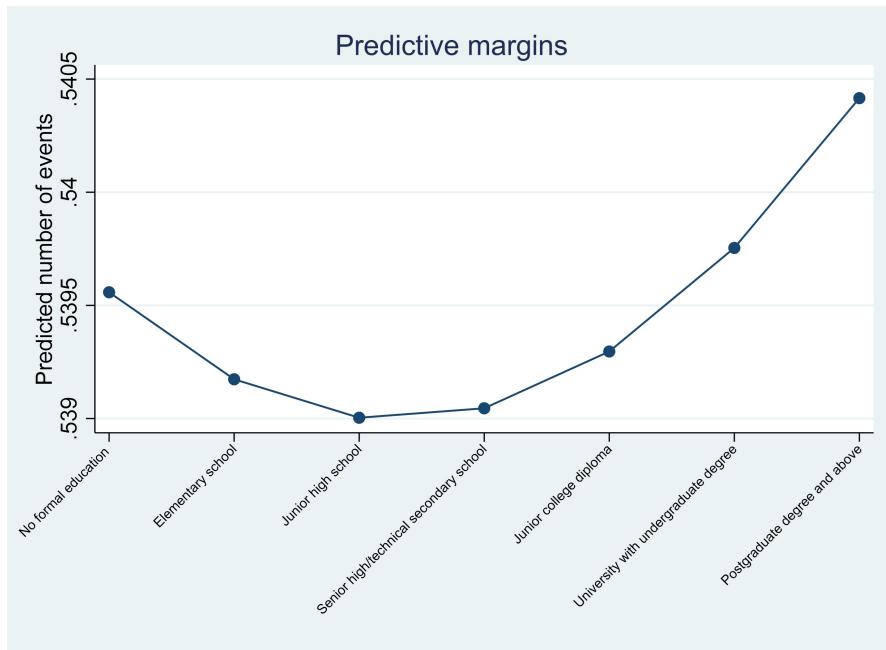
## 8 Figures



**Fig. 1:** Predictive margins of Internet information exposure by educational level. Predicted values of attitudes towards homosexuality are plotted for different levels of Internet information exposure (rarely, sometimes, frequently) across educational groups. Panel (a) displays the marginal effects for respondents with primary education or less, while Panel (b) shows the effects for those with higher education. Error bars represent standard errors. All axes are labelled in SI units—abbreviations: CGSS, China General Social Survey, SE, standard error.



**Fig. 2:** Predictive margins of birth cohort effects. Flow diagram illustrating the generational trend in attitudes towards homosexuality. Each line represents a different birth cohort (before 1949, 1950–1959, 1960–1969, 1970–1979, 1980–1989, 1990–2000, after 2000). Younger cohorts show progressively higher predicted acceptance. Error bars represent standard errors—abbreviations: CGSS, China General Social Survey; SE, standard error.



**Fig. 3:** Predictive margins of educational level effects. The figure shows the non-linear relationship between years of education and attitudes towards homosexuality. The effect of education on attitudes varies across different educational levels, with more complex patterns emerging for higher education groups. Error bars represent standard errors—abbreviations: CGSS, China General Social Survey; SE, standard error.

## 9 Data availability

All data analysed in this study are from the China General Social Survey (CGSS), which is publicly available at <http://cgss.ruc.edu.cn/>. The datasets are anonymised and can be accessed by qualified researchers upon request to the CGSS project. No new data were generated or analysed by the authors in this study.

## 10 Competing interests

The author(s) declare no competing interests.

## 11 Ethical statements

### 11.1 Ethical approval

This study uses secondary data from the China General Social Survey (CGSS), which is publicly available and anonymised. The study was conducted by the 1964 Helsinki Declaration and its subsequent amendments. No additional ethical approval was required for the analysis of these anonymised data sets.

### 11.2 Informed consent

The CGSS survey obtained informed consent from all participants at the time of data collection. All data used in this study are anonymised and do not contain any personally identifiable information.

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Any remaining errors are solely the responsibility of the authors.

## **13 Author Information**

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