

The Predictors of Negative Attitudes Toward Lesbians, Gay Men, and Bisexuals in
Heterosexual Youth in Chongqing, Southwest China: A Cross-Sectional Study

by

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Thesis submitted in partial fulfillment of
the requirements for the degree of
Master of Science in the Duke Global Health Institute
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ABSTRACT

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Abstract

Background: Lesbians, gay men, and bisexuals (LGBs) are a socially and economically disadvantaged population who often suffer from both physical and psychological health disparities worldwide. This is especially true in China, where Confucian values contribute to the marginalization of LGBs. To alleviate health disparities, there is a fundamental need to improve social acceptance of LGB groups. This study aimed to assess young heterosexual adults' attitudes toward LGBs, and to identify predictors of negative attitudes. These findings can help the Chinese government, as well as public health policymakers, to identify strategies for improving social acceptance of LGB individuals. If implemented, these efforts could ultimately help alleviate inequalities in health among LGB individuals in China.

Methods: This was a cross-sectional study using an Internet-based survey. A total of 109 heterosexual youth, aged between 18 and 34 years old, were recruited by snowball sampling strategy. A 97 item survey assessed: attitudes toward lesbians, gay men, and bisexuals; views of gender roles and family values; knowledge about homosexuality and reproduction; and contact experience with LGB groups. Independent sample t tests, simple linear regression, and multiple linear regression were utilized to analyze whether participant's sex and other key predictors impacted attitudes toward LGB groups.

Results: Male had more negative attitudes toward gay men and bisexuals, as compared to female participants. No sex difference in attitudes toward lesbians was found. Traditional views of gender roles, traditional views of family values, less knowledge about homosexuality, and no contact experience with LGBs were significant predictors of negative attitudes toward lesbians and gay men. Traditional views of gender roles and less knowledge about homosexuality were significant predictors of negative attitudes toward bisexuals. No significant interaction effect by sex was found; however, predictors of negative attitudes toward LGB groups were different when comparing male and female participants.

Conclusions: Sex differences were present in attitudes toward gay men and bisexuals. Contact experience was the most powerful predictor of negative attitudes toward lesbians and gay men. Knowledge about homosexuality was a consistent predictor of negative attitudes toward lesbians, gay men, and bisexuals. Interventions that can increase both *contact* with homosexuals and *education* about homosexuality and gender equality may be particularly valuable in developing friendlier attitudes toward LGB groups. Additionally, interventions that target medical professionals and are conducted at facility or community level may be effective in improving social acceptance and alleviate health disparities among LGB individuals. The Chinese government should encourage more academic research on LGB individuals in order to improve our ability to support these individuals.

Dedication

I dedicate my thesis to my family. A special feeling of gratitude to my loving parents whose encouragement has meant so much to me during the pursuit of my graduate degree and the composition of this thesis. Thank you to my husband, Ryo, through good times and bad. His kindness and extensive support have been ever-present in this important time of my life.

Finally, I dedicate my thesis to all LGB friends I have met, and those I have not, who battle with the dark days.

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during my research. This research would have not have been completed without their participation.

1. Introduction

1.1 Physical and mental health disparities among LGBs

Lesbians, gay men, and bisexuals (LGBs) are a socially and economically disadvantaged population who often experience poor physical and mental health outcomes. LGB individuals are less likely to have health insurance coverage, and are more likely to experience financial barriers to health care than their heterosexual counterparts (Gonzales & Blewett, 2014). Findings from several studies reveal that LGB individuals share a common pattern of physical and mental health disparities, compared to their heterosexual peers (Conron et al., 2010; Fredriksen-Goldsen et al., 2012; Fredriksen-Goldsen et al., 2013). In terms of physical health, LGB individuals are more likely to engage in excessive drinking and smoking behaviors than heterosexuals (Rinder et al., 2006; Balsam et al., 2012; Hagger-Johnson et al., 2013). Lesbians and bisexual women have a higher risk of cardiovascular disease and obesity than heterosexual females, while gay and bisexual males have a higher risk of diabetes compared to heterosexual males (Fredriksen-Goldsen et al., 2012; Fredriksen-Goldsen et al., 2013). In terms of mental health, LGB individuals are more likely to suffer from sexual assault victimization, prejudice, and discrimination because of their sexual orientation (Conron et al., 2010; Kosciw et al., 2012; Burton et al., 2013; Mereish et al., 2014; O'Malley Olsen et al., 2014). These negative experiences can be internalized, and contribute to psychological distress and mental illness including depression, anxiety,

and mood disorders (King et al., 2008; Fredriksen-Goldsen et al., 2013). Indeed, a systematic review revealed that LGB individuals were up to two times as likely as heterosexuals to experience depression and anxiety, and that LGB individuals had at least 1.5 times higher rates of suicidal behaviors and substance dependence than their heterosexual counterparts (King et al., 2008).

1.2 Declassification of homosexuality as a mental illness in China

Homosexuality is no longer considered a mental disorder in China. However, this change took many years after the movement in the United States (U.S.) to remove homosexuality as a mental disorder. In 1973, the American Psychiatric Association (APA) removed homosexuality from Diagnostic and Statistical Manual of Mental Disorder 3rd edition (DSM-III) (Spitzer, 1981). In 1992, the World Health Organization (WHO) also excluded homosexuality from International Classification Diseases 10th edition (ICD-10) (WHO, 1992). The action of declassifying homosexuality as a mental disorder from these two well-known authorities highlighted that having homosexual feelings or behavior was not a mental disorder, but a normal variant of human sexuality. It was only in March 2001, following pressure from the APA (Drescher & Lingardi, 2003), that the Chinese Psychiatric Association also followed the movement, and dropped homosexuality from the Chinese Classification and Diagnostic Criteria of Mental Disorders 3rd edition (CCMD-3) (Chen, 2002).

1.3 Stigma, discrimination and negative attitudes toward LGBs in China

Despite the declassification of homosexuality as a mental disorder in the CCMD-3, many LGB individuals still face stigma and discrimination in legal, political, and institutional environments in China. For example, in China, there is no anti-discrimination law related to LGB individuals. Although it is an issue of public discussion and interest, same-sex marriage remains illegal in China. In addition, victimization and discrimination of LGB students in educational settings is a critical issue, especially in rural and less developed areas in China (UNDP & USAID, 2014).

Furthermore, in social environments, homosexuality is still highly unacceptable in Chinese society. Even though LGB individuals and the term “homosexuality” have started appearing in mass media in China, most individuals still disagree that homosexuals should be accepted by society. Many LGB individuals face discrimination from their families because of their inability to get married, since the heterosexual family structure has the greatest influence in China (UNDP & UNAID, 2014). Previous research investigating attitudes toward homosexuals in China found widespread rejection of homosexuality in the younger generation, especially among males (Wang, 2007; Chen et al., 2008; Liu et al., 2011; Steward et al., 2013).

1.4 Negative attitudes and mental health disparities of LGBs in China

As a result of negative attitudes from heterosexuals, LGB individuals in China suffer from health disparities, especially in the area of mental health. Compared to heterosexuals, LGB individuals have a higher likelihood of experiencing depression, anxiety, and mood disorders (Yang et al., 2012; Wang et al., 2015). Further, the experience of mental distress is possibly attributable to a higher prevalence of substance abuse, as well as risky sexual behaviors amongst LGB individuals (Yu et al, 2013; Lian et al, 2015a). Importantly, LGB youths who engaged in these coping strategies long term have a higher prevalence of suicidal ideation and suicidal attempts than those who did not, and this relationship is bidirectional (Lian et al, 2015b).

1.5 Factors associated with negative attitudes toward LGBs

To reduce mental health disparities among LGB individuals in China, it is important for public health policymakers to address the mental health needs of LGB individuals (Tang & Sun, 2013). It is also critical for medical professionals to ensure that they provide health care services in which LGB patients can disclose their sexual orientation and receive supportive and integrated care (Ridner et al., 2006). However, the most fundamental and important factor for reducing health disparities among LGB individuals is to improve heterosexuals' attitudes toward them.

Improving attitudes toward LGB individuals requires an understanding of the factors associated with these attitudes. Many factors have been identified by previous

literature (Steffens & Wagner, 2004). However, most existing literature is based on studies conducted with Western populations.

Firstly, the association between contact experience and attitudes toward LGB individuals is well established in previous Western literature. Individuals with at least one lesbian or gay friend or relative have more favorable attitudes toward lesbians, gay men (Herek & Glunt, 1993; Herek & Capitano, 1996), and bisexuals (Herek, 2002a).

In addition, the association between gender roles and attitudes toward LGB individuals is also well supported in the Western literature. Individuals who hold strong stereotypes about male and female gender roles have more negative attitudes toward lesbians, gay men (Herek, 1988) and bisexuals (Herek, 2002a).

In previous Western studies about homophobia, knowledge about homosexuality shows a negative association with homophobia. Individuals with more scientific knowledge about homosexuals have more tolerant attitudes toward lesbians and gay men (Dunjić-Kostić et al., 2012; Bawari et al., 2015). In terms of studies on bi-phobia, to the authors' knowledge, no study assessed the impact of either knowledge about homosexuality or knowledge about bisexuality on attitudes toward bisexuals. Evidence of knowledge about LGB groups on heterosexuals' attitudes toward bisexuals is absent.

Furthermore, differences in attitudes toward LGB individuals by sex have been observed repeatedly in previous Western studies (1988; Herek & Glunt, 1993; Kite &

Whitely, 1996; Herek, 2002a; Steffens & Wagner, 2004; Matharu et al., 2012).

Heterosexual males are more likely to have negative attitudes toward lesbians, gay men, and bisexuals, as compared to heterosexual females. Interestingly, within these studies, some also reported on the associations of sex with other factors, including gender roles and knowledge of homosexuality. For example, in Kite and Whitely's study, males were likely to have more traditional views of gender roles compared to females (Kite & Whitely, 1996). Other studies found that males were likely to have a lower level of knowledge about homosexuality compared to females (Dunjić-Kostić et al., 2012; Bawari et al., 2015). These findings suggest that sex could be a third variable that modifies the effect of other factors on attitudes toward LGB individuals.

1.6 Confucianism in China

Given the fact that Confucianism dominates the value system in China (Adamczyk & Cheng, 2015), the context of China is somewhat different from countries, where previous studies of factors associated with attitudes toward LGB individuals have been conducted. Confucianism emphasizes the importance of family, reproduction, and the relationship between husband and wife (Park & Chesia, 2007). Specifically, it supports the heterosexual ideal of marriage, and highlights the responsibility of family as a means to continue the family lineage. Further, it underlies the differentiated roles of husband and wife, whereby the husband has primary responsibility to financially

support the family, while the wife is responsible for managing the home and caring for children.

Confucianism sees sexuality as taboo and forbids discussion about sex including parent-child communication on sexuality. Youth were inclined to keep their own sexual experiences a secret from their parents, even if they felt they needed help or advice. Parents adopt a “silencing” approach to sex-talk (Hong et al., 1993; Zhang et al., 2006; Gao et al., 2012). Therefore, Confucianism-based family values and restricted reproductive knowledge may influence heterosexual youths’ attitudes toward LGB individuals in China.

The only previous research about factors related to attitudes toward homosexuality in China supports the assumption described above. Feng et al (2012) found that individuals with greater knowledge about reproduction viewed homosexuality as a normal variant of human sexuality. Additionally, individuals with traditional views of family viewed homosexuality as unacceptable (Feng et al., 2012).

1.7 Rationale and Study aims

Given the fact that the issue of homosexuality has been discussed more frequently in mass media in recent years in China (Li et al., 2011), heterosexual individuals may be more aware of the existence of LGB groups, and may have more opportunities to interact with LGB individuals. To reduce the stigma and discrimination towards LGB individuals in China, and to alleviate health disparities among LGB

individuals, it is critical to understand attitudes toward them, and the predictors of negative attitudes toward LGBs. Compared to older LGB individuals, LGB youth are more likely to engage in risky behaviors and need social support from their friends (Shilo & Savaya, 2012). Therefore, it is crucial to measure their heterosexual peers' attitudes toward them in order to have an overall understanding about how young heterosexual adults think about this group in the context of China. It is also important include both factors that have been identified in Chinese context as well as in Western population.

To date, very little literature exists to understand the needs of LGB individuals in China. Only a handful of studies have focused on heterosexuals' attitudes toward LGB individuals in China (Wang, 2007; Chen et al., 2008; Li et al., 2011; Pyun et al., 2014). Among these studies, there was an emphasis on the description of general attitudes toward LGB individuals, but no examination of factors associated with attitudes toward LGB individuals. Moreover, many of them focused on attitudes toward gay men, while attitudes toward lesbians and bisexuals were not discussed. Similarly, previous studies on attitudes toward LGB individuals in Western countries have mainly focused on attitudes toward homosexuals, while study on attitudes toward bisexuals is scant (Herek, 2002a). In addition, since study populations and scales varied between studies, it is difficult to compare heterosexuals' attitudes toward different sexual orientation groups within one study.

To address the evidence gap, this study utilized an Internet-based questionnaire to assess the factors associated with and predictors of negative attitudes toward lesbians, gay men, and bisexuals among young, educated adults in Chongqing, Southwest China.

Figure 1 (below) summarizes the conceptual model of the present study's aims.

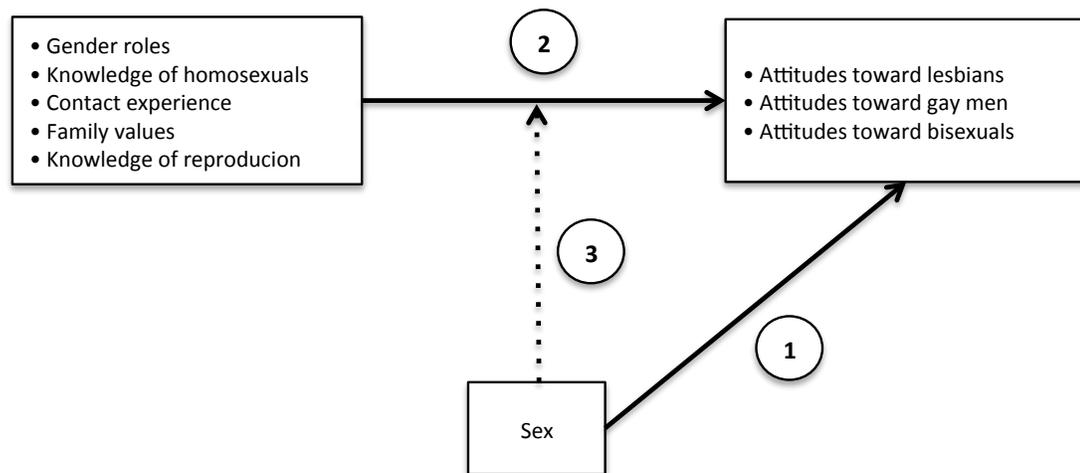


Figure 1: The conceptual model of study aims

Firstly, the study sought to assess the differences in attitudes toward LGB individuals by sex. Secondly, the study sought to examine factors associated with LGB attitudes from previous studies conducted with Western populations (i.e., gender roles, knowledge of homosexuality, contact experience) in addition to those factors associated with LGB attitudes in the context of China (i.e., family values and knowledge of reproduction). Thirdly, the study sought to explore sex as an effect modifier of the association between these factors and attitudes toward LGB individuals.

Findings from the study have the potential to inform LGB stigma reduction efforts in China. Predictors identified in the study can be utilized by LGB organizations and campaigns to improve social acceptance of LGB individuals. Specifically, the findings from the study may help the Chinese government, China CDC, and public health policymakers identify strategies for improving attitudes toward LGB individuals. If implemented, these efforts could ultimately help address inequalities in mental health among LGB individuals.

2. Methods

This was a cross-sectional study using an Internet-based questionnaire to assess the factors associated with, and predictors of, negative attitudes toward lesbians, gay men, and bisexuals among young, educated adults in Chongqing, Southwest China. Snowball sampling was used to recruit study participants. The final study sample for analysis included 109 participants between the ages of 18 to 34 years old.

2.1 Setting

The study was conducted in Chongqing, which is one of four municipalities in China. Other municipalities include Beijing, Shanghai, and Tianjin (Figure 2). A municipality is a city that is directly under the administration of the central government. Chongqing is the economic center of Western China (Chongqing Municipal People's Government, 2016). In addition, Chongqing is the largest in geographic area among all municipalities, and is also the most populous municipality, compared to Beijing and Shanghai, which are two well-known cities worldwide (Chongqing Data, 2016).



(1 = Beijing, 2=Tianjin, 3 = Chongqing, 4 = Shanghai)

Figure 2: The four municipalities in China

Although there are no official statistics about the population of LGB individuals in China or in Chongqing, several internet-based newspapers reported that due to the large size in both geographic area and population, Chongqing may have the largest population of LGB individuals, the most gay bars, and the most LGB serving organizations in the country (Renkou, 2005; Xinhuanet, 2005)¹. Most of the LGB serving organizations target men who have sex with men (MSM) and focus on prevention of HIV transmission². If these estimates are accurate, people who live in Chongqing may be

¹ To the author's knowledge, no updated data later than 2005 describing the population of LGB individuals in Chongqing is available. This may reflect the fact that issue of homosexuality is socially sensitive in China.

² HIVChina: the most famous LGB serving organization in Chongqing. Its official website is as follow:
http://www.weibo.com/cqlanyu?is_all=1

more likely to interact with LGB individuals than people living in other parts of the country.

2.2 Participants

2.2.1 Eligibility criteria

The eligibility criteria for this study were people who (1) lived in the city of Chongqing, (2) identified as heterosexual, and (3) were between 18 to 34 years old.

2.2.2 Exclusion criteria

There were no exclusion criteria in the present study. Participants who did not fit the eligibility criteria could still answer and complete the survey. Their data were not included in data analyses in the present study but were saved for future research opportunities.

2.2.3 Sampling method

Due to the social sensitivities of the study topic, snowball sampling was used to recruit participants. A total of 15 individuals were selected to be the seeds of the study; 8 were students and faculty members at Chongqing Medical University, and 7 were identified through the author's social network and included friends and colleagues. All selected individuals met the study eligibility criteria. They were informed about the study concept and agreed to serve as seeds and complete the study questionnaire.

2.2.4 Participant recruitment

In the beginning of June, the first short message including a hyperlink to the

Internet-based questionnaire was sent to the 15 selected individuals by a free messaging application, WeChat. They were asked to complete the questionnaire and forward the message to their own personal network. One month after the initial invitation, the same 15 individuals received a second short message asking them to distribute the hyperlink of the questionnaire to more people in order to obtain more responses.

2.3 Procedures

A 97-item questionnaire was developed and administered from the beginning of June to the end of July 2016 using the Internet-based survey tool, REDCap (<https://redcap.dtmi.duke.edu/redcap/>)³. An informed consent form for the study was included on the first page of the Internet-based questionnaire. After reading the informed consent form, individuals who chose to participate in the study were asked to push the “next page” button to start the questionnaire. Once study participants started completing the questionnaire, their answers were automatically recorded in REDCap.

The survey was anonymous. No identifiable information was collected in the questionnaire. Only the author had access to the password-protected database in REDCap. There was no compensation for participation in the study.

The study was approved by the Institutional Review Board for Non-Medical Research in the Office of Research Support at Duke University.

³ Study data were collected and managed using REDCap electronic data capture tools hosted at Duke University. REDCap (Research Electronic Data Capture) is a secure, web-based application designed to support data capture for research studies.

2.4 Measures

All scales described below were translated into Chinese, and then were back translated into English by two bilingual Ph.D. students at Duke University. The questionnaire was pilot tested by four Chinese Master's students in the Duke Global Health program in early May 2016. Two of the four students were from Duke University and the remaining two were from Duke Kunshan University.

The four students evaluated the accuracy, feasibility, and acceptability of the questionnaire. The Gender Roles scale, Knowledge of Homosexuals Questionnaire, and Knowledge of Reproduction Questionnaire, were adapted based on their feedback to make them more appropriate for the Chinese context. The adaptations are described in greater detail below.

2.4.1 Sexual orientation

Study participants were asked about their sexual orientation in the first part of the questionnaire. Sexual orientation status response options included: (1) heterosexual, (2) lesbian, (3) gay man, (4) bisexual, and (5) unknown.

2.4.2 Demographic information

Study participants then were asked about their demographic information including: (1) location of residence, (2) biological sex, (3) age group, (4) education level, and (5) income level. Table 1 (below) summarizes the classifications of these five categorical variables.

Table 1: The classification of demographic information

Demographic variable	Classification			
Location of residence	Chongqing	Other cities		
Biological sex	Male	Female	Unknown	
Age group (yrs)	18-24	25-34	35-44	45-54
Education level	Middle/High School	Technical School	University	Post-education
Income level (monthly) (US dollars)	≤ 436	437 - 873	874 - 1310	≥ 1311

As mentioned before, there were no exclusion criteria in the present study.

Participants who did not fit the eligibility criteria could still answer and complete the survey. Their data were not included in data analyses in the present study but were saved for future research opportunities.

2.4.3 Dependent variable

2.4.3.1 Attitudes Toward Lesbians, Gay Men and Bisexuals (ATLGB)

The Attitudes Toward Lesbians and Gay Men (ATLG) scale was developed by Herek (1988). The original scale consisted of 20 different statements, 10 about attitudes toward gay men (ATG) and 10 about attitudes toward lesbians (ATL). However, the score on the original ATL and ATG subscales were not directly comparable. Therefore, a new version of the ATLG scale was developed, and consisted of ATG and ATL subscales with parallel versions of 5 items (i.e., each item presented once in reference to gay men and once in reference to lesbians) (Herek, 1994). The parallel version has been found to

be highly correlated with the original scale, and its use has been recommended instead of the original scale (Herek, 1994).

Therefore, the present study adapted the parallel form of ATLG by adding five items to assess attitudes toward bisexuals (i.e., by replacing female or male homosexuality with bisexuality). The Attitudes Toward Lesbians, Gay Men and Bisexuals (ATLGB) scale adapted for this study consisted of 15 items. The ATLGB scale was separated into three subscales including the Attitudes Toward Lesbians (ATL), Attitudes Toward Gay Men (ATG), and Attitude Toward Bisexuals (ATB). Each subscale had 5 items. This is an example of one item as it appears in each subscale: "Male homosexuality is a perversion," "Female homosexuality is a perversion," and "Bisexuality is a perversion." The response categories ranged from 1 (i.e., strongly disagree) to 5 (i.e., strongly agree). For each subscale, the 5 items were summed, with a maximum possible score of 25 representing extremely negative attitudes, and a minimum possible score of 5 representing extremely positive attitudes. In this study, the Cronbach's alphas for the three subscales were as follows: 0.72 for ATL; 0.78 for ATG; and 0.80 for ATB.

2.4.4 Independent variables

2.4.4.1 Gender roles

Gender roles were defined as beliefs or attitudinal patterns characteristically associated with being male or female as defined in a given society. A 17-item scale

developed by Vanyperen and Buunk (1991) was slightly modified to measure the participants' attitudes toward gender roles in the present study. One item about taking the spouse's name during marriage was deleted based on the feedback from the pilot study.

The adapted Gender Roles scale contained 16 items. An example of one of the scale items was as follows: "It looks worse for a woman than for a man to be drunk." The response categories ranged from 1 (i.e., disagree completely) to 5 (i.e., agree completely). The 16 items were summed, with a maximum possible score of 80 representing extremely traditional view of gender roles, and a minimum possible score of 16 representing extremely egalitarian view of gender roles. In this study, the Cronbach's alpha of the Gender Roles scale was 0.70.

2.4.4.2 Family values

Family values were defined as beliefs or attitudes about family structure as well as family function. An 11-item version of the scale developed by Feng et al (2012) was used to measure participants' attitudes toward family values. An example of one of the scale items was as follows: "The worst thing one can do is to bring disgrace to one's family reputation." The response categories were 0 (i.e., disagreement), 1 (i.e., no opinion), and 2 (i.e., agreement). The 11 items were summed, with a maximum possible score of 22 representing extremely traditional view of family values, and a minimum

possible score of 0 representing extremely egalitarian view of family values. In this study, the Cronbach's alpha of Family Values scale was 0.55.

2.4.4.3 Knowledge of Homosexuals Questionnaire (KHQ)

The original Sex Education and Knowledge about Homosexuals Questionnaire (SEKHQ) was created using a compilation of 32 true/false statements used in questionnaires in the three previous studies (Harris et al. 1995; Alderson et al. 2009; Wells & Franken, 1987). For this study, 8 items were deleted based on the feedback from the pilot study.

The adapted KHQ included 24 statements related to knowledge about homosexuals. An example of one of the scale items was as follows: "A homosexual person's gender identity does not agree with his/her biological sex." The response categories were 0 (i.e., agreement), 1 (i.e., disagreement), and 2 (i.e., I do not know). The 24 items were summed with a maximum possible score of 24 representing all correct answers⁴. In this study, the Cronbach's alpha of KHQ was 0.83.

2.4.4.4 Knowledge of Reproduction Questionnaire (KRQ)

A 21-item Knowledge of Reproduction Questionnaire (KRQ) developed by Feng et al (2012) was slightly modified to measure the sexual and reproductive health knowledge of participants. One item was deleted based on the feedback from the pilot study.

⁴ Category of "I don't know" was considered incorrect answer.

The adapted KRQ contained 20 items. An example of one of the scale items was as follows: “A girl can become pregnant even if she only has sex once.” The response categories were 0 (i.e., agreement), 1 (i.e., disagreement), and 2 (i.e., I do not know). The 20 items were summed with a maximum possible score of 20 representing all correct answers⁴. In this study, the Cronbach’s alpha of KRQ was 0.94.

For the purpose of statistical analysis, the KRQ was changed from continuous variable to categorical variable during the data analysis process. The score was grouped to three categories (i.e., below median; median; above median) based on the Feng et al (2012) study.

2.4.4.5 Contact experience with LGBs

Contact experience was defined as directly (i.e., have been told by LGB individuals) or indirectly (i.e., speculated that a friend or relative might be LGB individuals) knowing LGB individual(s). The Contact Experience With LGBs question was developed by Herek and his colleagues (Herek et al., 1996). Participants were asked to answer “yes” or “no” to the questions, “do you have any friends, relatives, or close acquaintances who are lesbians, gay men, or bisexuals?” Participants who answered yes were assigned to the “having contact experience” group, while others were assigned to the “no contact experience” group.

2.5 Data analysis

All data were downloaded from REDCap (version 6.10.17, Vanderbilt), and saved as an MS Excel spreadsheet. The spreadsheet with eligible data was imported to Stata (StataCorp, version 14, College Station, TX) for data analysis. Statistical significance for all analyses was judged by a p value of 0.05 or less.

2.5.1 Descriptive statistics

Descriptive statistics were used to summarize the participants' demographic characteristics. The distribution of dependent and independent variables were assessed using histograms, and presented as percentages in each category. A test for Normality of all dependent and independent variables was assessed by both visual inspection and the Skewness-Kurtosis test.

2.5.2 Analysis for aim 1

To determine if there were sex differences in attitudes toward lesbians, gay men, and bisexuals, independent sample Student's t -tests were utilized. An independent sample t -test was conducted to compare the mean scores of attitudes toward lesbians, attitudes toward gay men, and attitudes toward bisexuals, by sex. The results are presented with t statistics and p values.

2.5.3 Analysis for aim 2

To determine if there were associations between attitudes toward lesbians, gay men, and bisexuals and other independent variables including gender roles, family

values, knowledge of homosexuality, knowledge of reproduction, and contact experience, graphic representations via scatterplots and univariable linear regressions were utilized.

First, the relationship of the dependent and independent variables was examined by visual inspection. Second, dependent and independent variables were fitted to a simple linear regression model to assess if there was a significant linear relationship between dependent and independent variables.

The independent variable, knowledge of reproduction, was first used as a continuous variable in linear regression. Then, since it was used as a categorical variable in Feng et al (2012) study, the variable, knowledge of reproduction, was grouped to three categories (i.e., below median, median, above median), and used as a categorical variable in linear regression. The separate results of treating the variable *knowledge of reproduction* as a continuous and categorical variable were compared.

2.5.4 Analysis for aim 3

Visual inspection, simple linear regression, and multiple linear regression were utilized to explore whether the association between dependent and independent variables differed by sex.

First, the association between dependent and independent variables was examined by different sex groups by visual inspection. The visual inspection was to help determine if there was a visual evidence for effect modification of the association by sex.

Then, the association between dependent and independent variables was examined by different sex groups using simple linear regression model. The Beta value as well as the p value were used to interpret the results.

Finally, based on the results from simple linear regression, the interaction term of sex and each independent variable was included into a multiple linear regression model to determine if the relationship between independent and dependent variables was statistically different by sex.

3. Results

3.1 Description of total numbers of survey

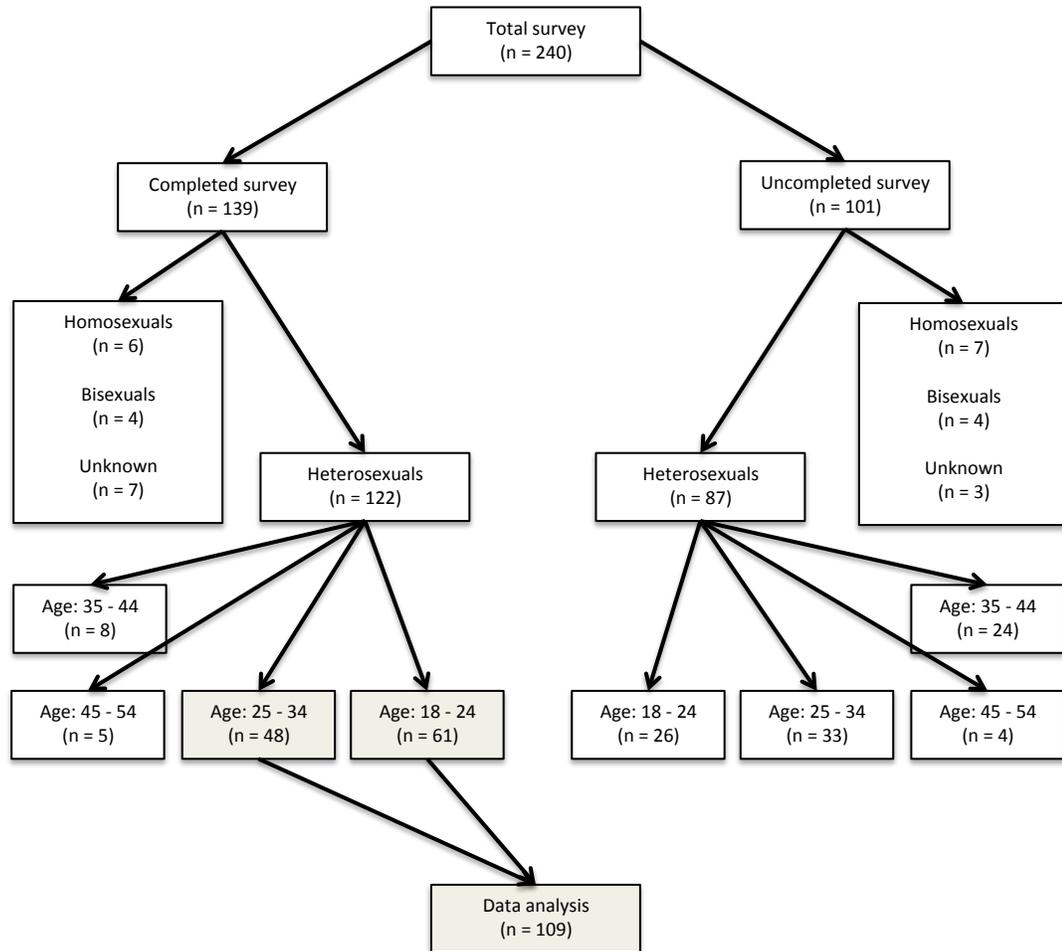


Figure 3: The distribution of total number of survey

Figure 3 (above) describes the distribution of total number of surveys. All participants reported lived in Chongqing. The total number of completed questionnaires

was 139. Out of the 139 participants, 122 were identified as heterosexuals. Among the 122 heterosexual participants, 109 individuals fit the eligibility criteria for age range (i.e., 18 to 34 years old). No participants had a degree of middle or high school in the completed questionnaire. There were no significant differences by sex ($\chi^2 = 2.9516$, 1df, $p = 0.086$), age group ($\chi^2 = 0.0000$, 1df, $p = 0.997$), education level ($\chi^2 = 0.5453$, 1df, $p = 0.761$), and income level ($\chi^2 = 0.7626$, 1df, $p = 0.858$) between those who completed the survey and those that did not complete the survey.

3.2 Description of the study population

The original study population included those ages 35 to 54. However, few participants (13 individuals) from this age range took in part of the survey. Therefore, based on the consideration of statistical power in this age range, the participants from this age range (i.e., 35 to 54 years old) were excluded from this study. The results generated from this study were based on the study population who lived in Chongqing, identified as heterosexual, and aged between 18 to 34 years old.

Table 2 (below) summarizes the demographic information of the study population. A total number of 109 participants met the study eligibility criteria, and were analyzed in this study. Sixty-nine (63.3%) participants were females, and 61 participants (60%) were 25 to 34 years old. Most participants reported having a Bachelor's degree, and a monthly income of less than 436 US dollars.

Table 2: Demographics of study populations

Variable (N = 109)		n	%
Biological sex	Male	40	36.70
	Female	69	63.30
Age (yrs)	18-24	48	44.04
	25-34	61	55.96
Education level	Middle/High school	0	0.00
	Technical school	1	0.92
	University	73	66.97
	Post-education	35	32.11
Income level (US dollar)	≤436	58	53.21
	437 - 873	33	30.28
	874 - 1310	12	11.01
	1311≥	6	5.50

3.2.1 Distribution of dependent and independent variables

Based on the results of the Skewness-Kurtosis test as well as visual inspection of the data, the dependent variables were normally distributed. Specifically, the attitudes toward lesbians score was normally distributed, with skewness of 0.29 and kurtosis of 0.51 ($\chi^2 = 1.60, p = 0.4500$). The attitudes toward gay men score was normally distributed with skewness of 0.29 and kurtosis of 0.93 ($\chi^2 = 4.82, p = 0.0897$). The attitudes toward bisexuals score was also normally distributed with skewness of 0.10 and kurtosis of 0.43 ($\chi^2 = 3.47, p = 0.1763$). For independent variables, the gender roles score was normally

distributed with skewness of 0.51 and kurtosis of 0.89 ($\chi^2 = 0.47, p = 0.7917$). The family values score was also normally distributed with skewness of 0.08 and kurtosis of 0.71 ($\chi^2 = 3.27, p = 0.1951$). However, knowledge about homosexuality was non-normally distributed with skewness of 0.66 and kurtosis of 0.0016 ($\chi^2 = 8.91, p = 0.0116$). The knowledge of reproduction score was also non-normally distributed with skewness of 0.0064 and kurtosis of 0.0059 ($\chi^2 = 12.48, p = 0.0020$). In terms of contact experience, nine participants did not answer the question related to contact experience. Fifty-nine participants (59%) had no contact experience with LGB individuals.

3.3 Analysis of sex differences in attitudes toward LGB groups

Table 3 summarizes the results of independent t-tests on sex differences in the three dependent variables. First, there was no significant difference in attitudes toward lesbians between male and female participants (females: $\mu = 10.8, SD = 3.96$; males: $\mu = 12.5, SD = 4.51$). However, compared to females, male participants had significantly more negative attitudes toward gay men (females: $\mu = 10.7, SD = 3.98$; males: $\mu = 14.3, SD = 5.53$). In addition, compared to females, male participants had significantly more negative attitudes toward bisexuals (females: $\mu = 12.5, SD = 4.89$; males: $\mu = 14.8, SD = 5.67$).

Table 3: Independent t-tests of sex differences in attitudes toward LGB groups

Variable, μ (SD)	Male (n = 40)	Female (n =69)	t	p
Attitudes toward Lesbians	12.5 (4.51)	10.8 (3.96)	1.9535	0.0534
Attitudes toward Gay Men	14.3 (5.53)	10.7 (3.98)	3.8635	0.0002 ***
Attitudes toward Bisexuals	14.8 (5.67)	12.5 (4.89)	2.2164	0.0288 *

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

The descriptive statistics for the distribution of each item of ATL, ATG, and ATB scales were shown in Supplemental Tables, Appendix A.

3.4 Analysis of association between dependent and independent variables

3.4.1 Association between independent variables and attitudes toward lesbians

Table 4 summarizes the results of simple linear regression on the association between independent variables and attitudes toward lesbians.

First, gender roles and family values had a significant positive association with the attitudes toward lesbians score. Individuals who had more traditional views of family values and gender roles had more negative attitudes toward lesbians.

Specifically, for one additional point in the gender roles scale, the score of ATL was estimated to increase 0.24 points ($\beta = 0.24$, 95%CI 0.13 – 0.34). For one additional point in the family values scale, the score of ATL was estimated to increase 0.35 points ($\beta = 0.35$, 95%CI 0.06 – 0.64).

Secondly, knowledge of homosexuals and contact experience with LGB individuals had a significant negative association with the attitudes toward lesbians score. Individuals who had a higher level of knowledge about homosexuality and who had experience of directly or indirectly knowing LGB individuals had less negative attitudes toward lesbians. Specifically, for one additional point in the knowledge of homosexuals scale, the score of ATL was estimated to decrease 0.29 points ($\beta = -0.29$, 95%CI -0.45 – -0.14). For those with contact experience with LGB individuals, the score of ATL was estimated to decrease 2.75 points ($\beta = -2.75$, 95%CI -4.41 – -1.09).

Lastly, there was no significant association between knowledge of reproduction and attitudes toward lesbians ($\beta = -0.09$, 95%CI -0.22 – 0.03).

Table 4: Simple linear regression analysis of attitudes toward lesbians

Independent variables	ATL		
	β	95% CI	p
Gender roles	0.24	0.13 - 0.34	0.000***
Family values	0.35	0.06 - 0.64	0.020*
Knowledge of homosexuals	-0.29	-0.45 - -0.14	0.000***
Knowledge of reproduction	-0.09	-0.22 - 0.03	0.152
Contact experience	-2.75	-4.41 - -1.09	0.001**

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

3.4.2 Association between independent variables and attitudes toward gay men

Table 5 summarizes the results of simple linear regression models on the association between independent variables and attitudes toward gay men.

First, gender roles and family values had a significant positive association with the attitudes toward gay men score. Individuals who had more traditional views of family and gender had more negative attitudes toward gay men. Specifically, for one additional point in the gender roles scale, the score of ATG was estimated to increase 0.31 points ($\beta = 0.31$, 95%CI 0.18 – 0.43). For one additional score in the family values scale, the score of ATG was estimated to increase 0.60 points ($\beta = 0.60$, 95%CI 0.27 – 0.92).

Secondly, knowledge of homosexuals and contact experience with LGB individuals had a significant negative association with the attitudes toward gay men score. Individuals who had a higher level of knowledge about homosexuality and had contact experience with LGB individuals had less negative attitudes toward gay men. Specifically, for one additional point in the knowledge of homosexuals scale, the score of ATG was estimated to decrease 0.35 points ($\beta = -0.35$, 95%CI -0.53 – -0.17). For those with contact experience with LGB individuals, the score of ATG was estimated to decrease 4 points ($\beta = -4.00$, 95%CI -5.87 – -2.15).

Lastly, there was no significant association between knowledge of reproduction and attitudes toward gay men ($\beta = -0.02$, 95%CI -0.16 – 0.13).

Table 5: Simple linear regression analysis of attitudes toward gay men

Independent variables	ATG		
	β	95% CI	p
Gender roles	0.31	0.18 - 0.43	0.000***
Family values	0.60	0.27 - 0.92	0.000***
Knowledge of homosexuals	-0.35	-0.53 - -0.17	0.000***
Knowledge of reproduction	-0.02	-0.16 - 0.13	0.833
Contact experience	-4.00	-5.87 - -2.15	0.000***

*** $p < .001$.

3.4.3 Association between independent variables and attitudes toward bisexuals

Table 6 summarizes the results of simple linear regression on the association between independent variables and attitudes toward bisexuals.

First, gender roles had a significant positive association with the attitudes toward bisexuals score. Individuals who had more traditional views of gender had more negative attitudes toward bisexuals. Specifically, for one additional point in the gender roles scale, the score of ATB was estimated to increase 0.24 points ($\beta = 0.24$, 95%CI 0.10 – 0.38).

Secondly, knowledge of homosexuals had a significant negative association with the attitudes toward bisexuals score. Individuals who had higher level of knowledge about homosexuality had less negative attitudes toward bisexuals. Specifically, for one

additional point in the knowledge of homosexuals scale, the score of ATB was estimated to decrease 0.33 points ($\beta = -0.33$, 95%CI -0.53 – -0.13).

Lastly, the results of association with attitudes toward bisexuals showed that family values and contact experience were not significantly associated with attitudes toward bisexuals (family values: $\beta = 0.31$, 95%CI -0.50 – 0.69; contact experience: $\beta = 2.14$, 95%CI -4.29 – 0.02, respectively). Additionally, there was no significant association between knowledge of reproduction and attitudes toward bisexuals ($\beta = -0.03$, 95%CI -0.19 – 0.13).

Table 6: Simple linear regression analysis of attitudes toward bisexuals

Independent variables	ATB		
	β	95% CI	p
Gender roles	0.24	0.10 - 0.38	0.001**
Family values	0.32	-0.50 - 0.69	0.089
Knowledge of homosexuals	-0.33	-0.53 - -0.13	0.002**
Knowledge of reproduction	-0.03	-0.19 - 0.13	0.685
Contact experience	-2.14	-4.29 - 0.02	0.052

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

3.4.4 Association between knowledge of reproduction and attitudes toward LGB groups

The Knowledge of Reproduction Questionnaire was developed by Feng et al (2012). In their study, this variable was used as a categorical variable. Therefore, the present study grouped the variable to three categories based on Feng et al (2012) study.

Since knowledge of reproduction was not normally distributed, the median was used instead of the mean to summarize the variable. Knowledge of reproduction was transformed to a categorical variable including three categories. They were “below median,” “median,” and “above median” categories.

Table 7 summarizes the results of simple linear regression on the association between attitudes toward LGB groups and the categorical variable, knowledge of reproduction. Even though there was still no significant association between attitudes toward LGB groups and knowledge of reproduction, different levels of reproductive knowledge suggested a different trend on attitudes toward LGB groups.

Table 7: Association between attitudes toward LGB groups and level of knowledge of reproduction^a

N = 109	ATL			ATG			ATB		
	Knowledge of reproduction (categorical)	β	95%CI	p	β	95%CI	p	β	95%CI
Median	1.64	-1.71 - 5.00	0.334	0.89	-3.04 - 4.82	0.656	3.81	-0.34 - 7.97	0.071
Above median	-0.83	-2.48 - 0.83	0.325	-0.30	-2.23 - 1.64	0.762	-0.92	-2.97 - 1.13	0.374

^a Below median = referent group

As a result, knowledge of reproduction showed a curved relationship with attitudes toward LGB groups. Depending on the level of knowledge about reproduction, it could have either a negative or positive regression coefficient on the score of ATL, ATG, and ATB scales, compared to referent group (i.e., below median category). Specifically, compared to a low level of knowledge about reproduction (i.e., below median category), individuals who had some level of knowledge about reproduction (i.e., median category) had more negative attitudes toward LGB groups. However, compared to a low level of knowledge about reproduction, individuals who had a high level of knowledge about reproduction (i.e., above median category) had less negative attitudes toward LGB groups. This trend is more clearly shown in Figure 4, which summarizes the relationship between the category of knowledge about reproduction and the attitudes toward bisexuals score.

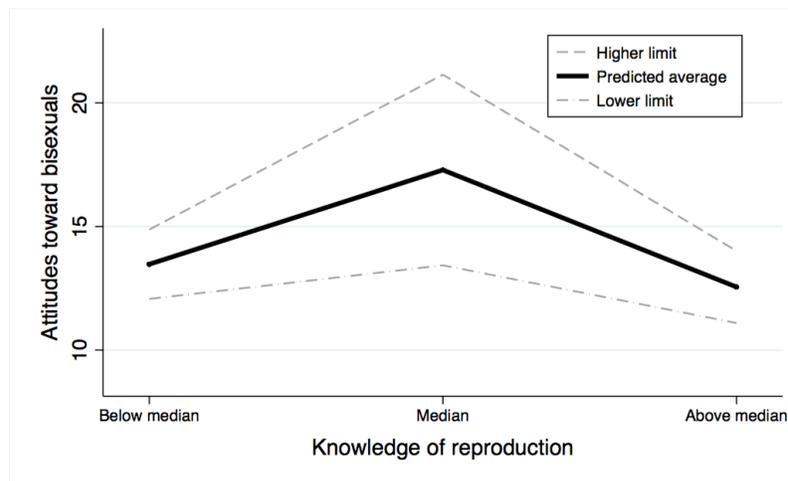


Figure 4: Trend of reproductive knowledge on attitudes toward bisexuals

3.5 Analysis of effect modification by sex

Before fitting interaction terms between sex and select independent variables on attitudes toward LGB groups, the associations between independent variables and attitudes toward LGB groups in different sex groups were examined.

3.5.1 Association between independent variables and attitudes toward lesbians by sex

Table 8 summarizes the results of simple linear regression on the association between independent variables and attitudes toward lesbians by sex.

Table 8: Simple linear regression analysis of attitudes toward lesbians in male and female group

Independent variables	Male (n = 40)			Female (n = 69)		
	β	95% CI	p	β	95% CI	p
Gender-role value	0.15	-0.72 - 0.37	0.178	0.26	0.13 - 0.40	0.000 ^{***}
Family value	0.12	-0.39 - 0.63	0.629	0.43	0.05 - 0.80	0.025 [*]
Knowledge of homosexuality	-0.38	-0.69 - -0.08	0.014 [*]	-0.22	-0.41 - -0.34	0.022 [*]
Knowledge of reproduction	-0.09	-0.34 - 0.15	0.432	-0.10	-0.25 - 0.05	0.174
Contact experience ^a	-2.12	-5.23 - 0.99	0.176	-2.70	-4.68 - -0.72	0.008 ^{**}

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

^a n = 100

The gender roles score was significantly associated with the attitudes toward lesbians score in females ($\beta = 0.26$, 95%CI 0.13 – 0.40), but not in males. For one

additional point in gender roles scale, the score of ATL was estimated to increase 0.26 points in females.

The family values score was significantly associated with the attitudes toward lesbians score in females ($\beta = 0.43$, 95%CI 0.05 – 0.80), but not in males. For one additional score in family values scale, the score of ATL was estimated to increase 0.43 points in females.

Contact experience was also significantly associated with the attitudes toward lesbians score in females ($\beta = -2.70$, 95%CI -4.68 – -0.72), but not in males. By having the experience of knowing LGB individuals, the score of ATL was estimated to decrease 2.7 points in females.

The knowledge of reproduction score showed a non-significant association with the attitudes toward lesbians score in both males and females. The results from treating the variable knowledge of reproduction as a categorical variable agreed with the results from treating it as a continuous variable.

In addition, the knowledge of homosexuality score was significantly associated with the attitudes toward lesbians score in both males and females. For one additional point in knowledge of homosexuality, the score of ATL was estimated to decrease 0.38 points in males ($\beta = -0.38$, 95%CI -0.69 – -0.08), and 0.22 points in females ($\beta = 0.22$, 95%CI -0.41 – -0.34). This relationship is also summarized in Figure 5 (below).

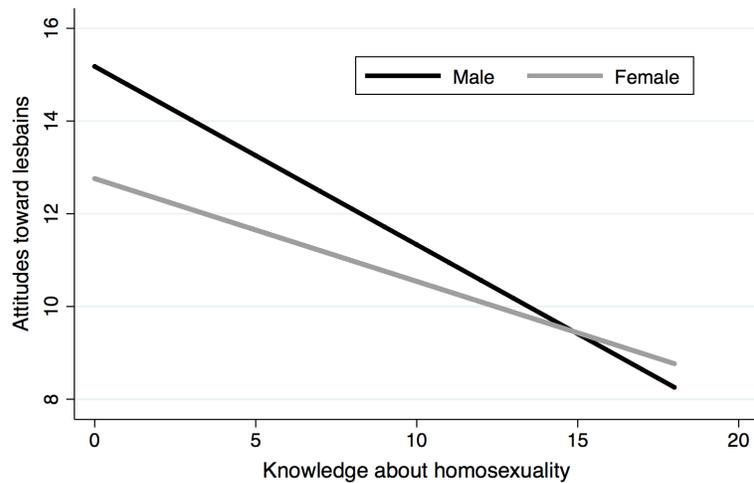


Figure 5: Association between knowledge of homosexuals and attitudes toward lesbians by sex

As shown in Figure 5, males with a lower level of knowledge of homosexuality reported more negative attitudes toward lesbians, compared to females with lower level of knowledge of homosexuality. On the other hand, males with higher level of knowledge of homosexuality had less negative attitudes toward lesbians, compared to females with higher level of knowledge of homosexuality.

The visual evidence and results shown in Table 8 suggests an effect modification of sex for this relationship. Therefore, to further assess the effect modification of sex, interaction terms between sex and select independent variables were examined in multiple linear regression.

3.5.1.1 Interaction of sex and independent variables on attitudes toward lesbians

Table 9 summarizes the results of multiple linear regression with an interaction term between sex and select independent variables on attitudes toward lesbians. Effect

modification by sex was not found. The associations between the independent variables and attitudes toward lesbians were not significantly different by sex.

Specifically, for knowledge of homosexuality, even though the interaction effect was visually observed in Figure 5, statistically the association between knowledge of homosexuality and attitudes toward lesbians was not significantly different by sex ($\beta = 0.16$, 95%CI -0.18 – 0.50).

Table 9: Multiple linear regression with interaction terms for sex and select variables in attitudes toward lesbians

Interaction term		ATL		
		β	95% CI	p
Sex and	Gender-roles	0.11	-0.13 - 0.35	0.355
	Family values	0.31	-0.30 - 0.91	0.317
	Knowledge of homosexuality	0.16	-0.18 -0.50	0.345
	Knowledge of reproduction	-0.01	-0.27 - 0.26	0.965
	Contact experience (n = 100)	-0.58	-4.08 - 2.91	0.742

3.5.2 Association between independent variables and attitudes toward gay men by sex

Table 10 summarizes the results of simple linear regression on the association between independent variables and attitudes toward gay men by sex.

Table 10: Simple linear regression analysis of attitudes toward gay men in male and female group

Independent variables	Male (n = 40)			Female (n = 69)		
	β	95% CI	p	β	95% CI	p
Gender roles	0.23	-0.04 - 0.50	0.091	0.27	0.13 - 0.40	0.000 ^{***}
Family values	0.28	-0.34 - 0.90	0.372	0.62	0.26 - 0.98	0.001 ^{**}
Knowledge of homosexuality	-0.39	-0.77 - -0.01	0.047 [*]	-0.26	-0.45 - -0.07	0.007 ^{**}
Knowledge of reproduction	0.00	-0.30 - 0.30	0.999	-0.05	-0.19 - 0.10	0.542
Contact experience ^a	-3.37	-7.12 - 0.38	0.077	-3.47	-5.35 - -1.60	0.000 ^{***}

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

^a n = 100

The gender roles score was significantly associated with the attitudes toward gay men score in females ($\beta = 0.27$, 95%CI 0.13 – 0.40), but not in males. For one additional point in the gender roles scale, the score of ATG was estimated to increase 0.27 points in females.

The family values score was significantly associated with the attitudes toward gay men score in females ($\beta = 0.62$, 95%CI 0.26 – 0.98), but not in males. For one additional point in the family values scale, the score of ATL was estimated to increase 0.62 points in females.

Contact experience was significantly associated with the attitudes toward gay men score in females ($\beta = -3.47$, 95%CI -5.35 – -1.06), but not in males. For one additional point in contact experience, the score of ATG was estimated to decrease by 3.47 points in females.

The knowledge of reproduction score showed a non-significant association with the attitudes toward lesbians score in both males and females. The results from treating the variable knowledge of reproduction as a categorical variable agreed with the results from treating it as a continuous variable.

Knowledge of homosexuality was significantly associated with the attitudes toward gay men score in both males and females. For one additional point in knowledge of homosexuality, the score of ATG was estimated to decrease 0.39 points in males ($\beta = -0.39$, 95%CI -0.77 – -0.01), and 0.26 points in females ($\beta = 0.26$, 95%CI -0.45 – -0.04). This relationship is also summarized in Figure 6 (below).

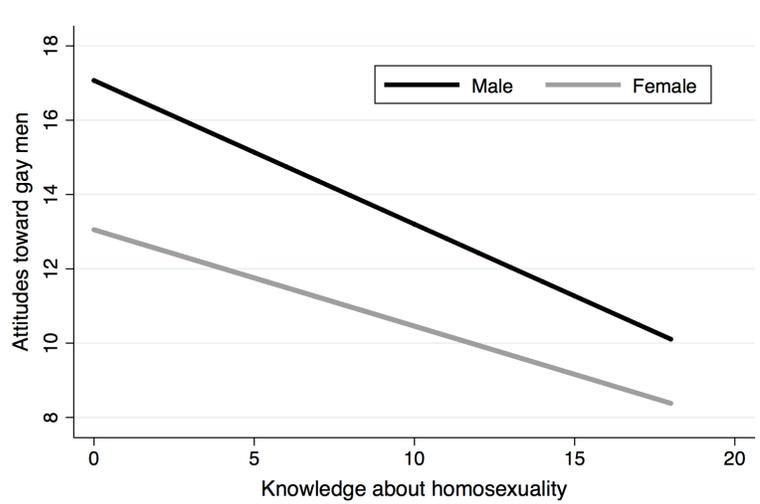


Figure 6: Association between knowledge of homosexuals and attitudes toward gay men by sex

As shown in Figure 6, these two predicted lines were not parallel. Individuals with higher level of knowledge about homosexuals had less negative attitudes toward

gay men, regardless their sex. Additionally, females had less negative attitudes toward gay men than males, regardless of the level of knowledge about homosexuals.

The visual evidence and results shown in Tables 10 suggests effect modification of sex for this relationship. Therefore, to assess the further effect modification of sex, interaction terms between sex and select independent variables were examined in multiple linear regression.

3.5.2.1 Interaction of sex and independent variables on attitudes toward gay men

Table 11 summarizes the results of multiple linear regression with an interaction term between sex and select variables on attitudes toward gay men. Effect modification by sex was not found. The associations between independent variables and attitudes toward gay men were not significantly different by sex.

Table 11: Multiple linear regression with interaction terms for sex and select variables in attitudes toward gay men

		ATG		
Interaction term		β	95% CI	p
Sex and	Gender-roles	0.04	-0.23 - 0.30	0.792
	Family values	0.35	-0.30 - 0.10	0.295
	Knowledge of homosexuality	0.13	-0.25 - 0.50	0.505
	Knowledge of reproduction	-0.05	-0.34 - 0.25	0.762
	Contact experience (n = 100)	-0.10	-3.87 - 3.66	0.957

3.5.3 Association between independent variables and attitudes toward bisexuals by sex

Table 12 summarizes the results of simple linear regression on the association between independent variables and attitudes toward bisexuals by sex.

Table 12: Simple linear regression analysis of attitudes toward bisexuals in male and female group

Independent variables	Male (n = 40)			Female (n = 69)		
	β	95% CI	<i>p</i>	β	95% CI	<i>p</i>
Gender roles	0.22	-0.06 - 0.49	0.124	0.21	0.27 - 0.38	0.024*
Family values	0.40	-0.23 - 1.03	0.202	0.10	-0.38 - 0.58	0.670
Knowledge of homosexuality	-0.29	-0.69 - 0.11	0.148	-0.30	-0.53 - -0.07	0.012***
Knowledge of reproduction	0.05	-0.26 - 0.35	0.768	-0.09	-0.27 - 0.10	0.350
Contact experience ^a	-1.31	-5.30 - 2.68	0.510	-1.98	-4.57 - 0.60	0.130

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

^a n = 100

The gender roles score was significantly associated with the attitudes toward bisexuals score in females ($\beta = 0.26$, 95%CI 0.13 – 0.40), but not in males. For one additional point in the gender roles scale, the score of ATB was estimated to increase 0.21 points in females.

The scores of family values, contact experience, and knowledge of reproduction were not significantly associated with the attitudes toward bisexuals score for either males or females. For knowledge of reproduction, the results from treating it as a categorical variable agreed with the results from treating it as a continuous variable.

The knowledge of homosexuality score was also significantly associated with attitudes toward bisexuals in females ($\beta = 0.22$, 95%CI -0.41 – -0.34), but not in males. For one additional point in knowledge of homosexuals, the score of ATB was estimated to decrease 0.30 points in females. This relationship is summarized in Figure 7.

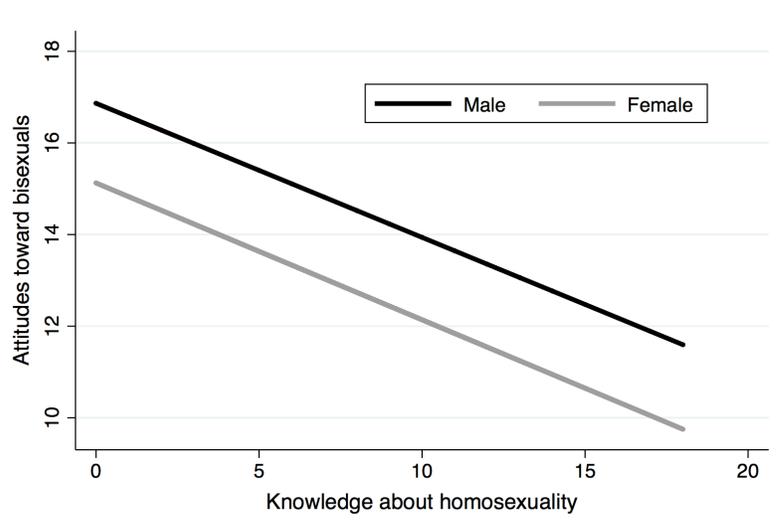


Figure 7: Association between knowledge of homosexuals and attitudes toward bisexuals by sex

As shown in Figure 7, the predicted line of males and the predicted line of females were approaching parallel.

Based on the visual evidence and the results from Table 12, there is little evidence suggesting that an effect modification by sex is present in the association between independent variables and attitudes toward bisexuals. The difference between the change of the score of ATB in males and the change of the score of ATB in females was small. For example, for knowledge of homosexuals, the difference between the

change of the score of ATB in males ($\beta = -0.29$, 95%CI -0.69 – 0.11) and the change of the score of ATB in females ($\beta = -0.30$, 95%CI -0.53 – -0.07) was 0.01 point.

However, to provide statistical evidence of whether the effect modification by sex was present or not, interaction terms between sex and select independent variables were examined.

3.5.3.1 Interaction of sex and independent variables on attitudes toward bisexuals

Table 13 summarizes the results of multiple linear regression with an interaction term on attitudes toward bisexuals. Effect modification by sex was not found. The associations between independent variables and attitudes toward bisexuals were not significantly different by sex.

Table 13: Multiple linear regression with interaction terms for sex and select variables in attitudes toward bisexuals

Interaction term		ATB		
		β	95% CI	<i>p</i>
Sex and	Gender-roles	-0.01	-0.32 - 0.30	0.955
	Family values	-0.30	-1.06 - 0.46	0.432
	Knowledge of homosexuality	-0.01	-0.44 - 0.43	0.979
	Knowledge of reproduction	-0.13	-0.46 - 0.20	0.439
	Contact experience	-0.68	-5.21 - 3.86	0.768

4. Discussion

This study aimed to understand the attitudes toward LGB individuals among young adults in China, in order to inform interventions to change attitudes and thus reduce stigma, discrimination, and health disparities amongst LGB individuals in China. The study found differences in attitudes toward LGB individuals by sex, with male participants being more likely to hold negative attitudes toward gay men and bisexuals than female participants. The study also identified predictors of negative attitudes toward LGB individuals, and found different sets of predictors of negative attitudes by sex of participant. To our knowledge, this study is the first to assess the predictors of young heterosexual adults' negative attitudes toward LGB individuals in China. Predictors identified in the study may help the Chinese government, China CDC, and public health policymakers to develop interventions for improving social acceptance of LGB individuals. Those interventions can support the LGB movement in China, and work towards eliminating social and health disparities of LGBs.

4.1 Difference in attitudes toward LGBs by sex

The first main finding of this study was that sex differences were present in attitudes toward gay men as well as bisexuals, but not in attitudes toward lesbians. Male participants held more negative attitudes toward gay men and toward bisexuals, compared to female participants. However, there was no difference between males and females in attitudes toward lesbians.

Results of difference in attitudes toward gay men as well as bisexuals by sex are consistent with findings from previous literature. In prior research, males were more likely to have negative attitudes toward gay men and bisexuals than females (Herek, 1988; Herek & Glunt, 1993; Herek, 2002a). Although this study found no difference in attitudes toward lesbians by sex, there are conflicting results about this association in the literature. Some research has found heterosexual females' attitudes toward lesbians to be more negative than those of heterosexual males (Gentry, 1988; Whitley, 1990), while other research has found no sex difference in attitudes toward lesbians (Herek, 1988). One possible explanation for these diverse results is that these studies examined attitudes using different scales. Due to the use of different scales, these studies might measure different dimensions of attitudes toward lesbians including attitudes toward lesbian individuals, attitudes toward lesbian behaviors, and attitudes toward lesbian civil rights (Kite & Whitley, 1996). This study adopted the Attitudes Toward Lesbians and Gay Men (ATLG) scale developed by Herek (1988), and found consistent results with Herek's study (1988), with no difference in attitudes toward lesbians between males and females.

4.1.1 Males' negative attitudes and gender belief system

Previous literature suggests that an individual's gender belief system may play a role in heterosexuals' attitudes toward LGBs. The concept, gender belief system, was first proposed by Deaux and Kite (1987a). They defined gender belief system as "a set of

beliefs and opinion about males and females and about the purported qualities of masculinity and femininity” (Deaux & Kite, 1987a, p. 97). It includes stereotype of males and females as well as attitudes toward appropriate roles for the sexes.

Based on this theory, first, homosexuals are seen as individuals who violate the gender belief system. Specifically, in another study, Deaux and Kite found that homosexual males were more likely to be viewed as heterosexual females than heterosexual males, and homosexual females were more likely to be viewed as heterosexual males than heterosexual females (Deaux & Kite, 1987b). Secondly, male sex role is viewed more rigidly than female sex role in the gender belief system (Herek, 1986; Herek, 2002b). The gender belief system places more emphasis on the importance of heterosexuality to masculinity than femininity. This emphasis may make heterosexual males internalize those standards and experience anxiety when they fail to evaluate the male sex role (Herek, 1986; Kite & Whitely, 1998). Thirdly, to affirm the masculinity, males may feel the need to reject individuals who violate the male sex roles (Herek, 1988; Herek, 2002b). Therefore, heterosexual males may be more likely than heterosexual females to view homosexual males’ behavior as inappropriate.

4.1.2. Anti-gay attitudes and anti-bi attitudes

In this study, the attitudes toward bisexuals scale showed higher mean scores than the attitudes toward gay men scale. Participants expressed more negative attitudes toward bisexuals than those toward gay men; further, males expressed more negative

attitudes toward bisexuals than females did. These differences between male and female participants, and between different sexual orientation groups raise interesting questions about heterosexuals' cognition of bisexuals.

The findings of attitudes toward bisexuals suggest that bisexuals may be the targets of greater negative attitudes than gay men. Previous studies have pointed out that the expressions of hostility toward bisexuals may be rooted in anti-gay attitudes (Blumenfeld, 1992; Rodriguez Rust, 2000; Herek, 2004), and bisexual individuals also reported that they were more likely to be seen as homosexuals by heterosexuals (Rodriguez Rust, 2000). This study speculates that the attitudes toward bisexuals differ from attitudes toward gay men. First, heterosexuals may view bisexual relationships as polygamy or non-monogamy, since bisexuality is formed by both heterosexual relationships as well as homosexual relationships (McLean, 2004; Garnets & Kimmel, 2003). Secondly, bisexuality may be seen as challenging the heterosexual-homosexual dichotomy of sexuality (McConaghy, 1984). The results from this study are consistent with a previous study, which used a national probability sample to compare attitudes toward gay men and lesbians with attitudes toward bisexual men and women (Herek, 2002a). Specifically, attitudes toward bisexual men and women were more negative than for gay men and lesbians, and heterosexual males showed more negative attitudes toward bisexuals males than heterosexual females did (Herek, 2002b). However, since this study investigated bisexuals as a whole, and not as bisexual males and bisexual

females, we do not have insight into the differences in attitudes toward bisexual males and bisexual females. Since heterosexual individuals are more likely to think about gay men when they see the term “homosexuals,” (Committee on Lesbian and Gay Concerns, APA, 1991; Kite & Whitely, 1996) this study assume the term “bisexuals” would be characterized similar, in that participants might have considered bisexuals as bisexual males rather than both bisexual males and females.

4.2 Predictors of attitudes toward lesbians and gay men

The second main finding of this study was that the same predictors were identified as significant for attitudes toward both lesbians and gay men. Figure 8 (below) summarizes the results of predictors of negative attitudes toward lesbians and gay men. Having a more traditional view of gender, a more traditional view of family, a lower level of knowledge about homosexuality, and no contact experience with LGB individuals were significant predictors of negative attitudes toward both lesbians and gay men. Among these predictors, contact experience with LGB individuals was the most powerful predictor of negative attitudes toward lesbians and gay men.

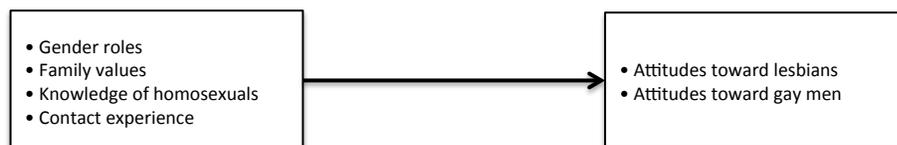


Figure 8: Predictors of negative attitudes toward lesbians and gay men

Predictors identified in this study have been also identified in previous literature (Herek, 1988; Herek & Glunt, 1993; Dunjić-Kostić et al., 2012; Feng et al., 2012; Banwari et al., 2015). However, this study is different from previous study in methodology. The first difference is in the terminology used in previous literature. Many studies use the term “homosexuals” rather than the more specific terms “lesbians and gay men.” This usage may cause bias because heterosexual individuals are more likely to think about gay men when they see the term “homosexuals” (Committee on Lesbian and Gay Concerns, APA, 1991; Kite & Whitley, 1996). The second difference is found in the number of predictors used in previous literature. Many studies have identified one or more of the predictors used in this study, while no studies have considered all of them simultaneously. The strength of using more specific terminology is that it can avoid statistically indiscernible results. For example, findings from this study revealed that lesbians were viewed less negatively than gay men by heterosexuals, however this result cannot be observed in studies using term “homosexuals.” The strength of including all predictors in one study is that the regression coefficients of predictors can be compared in the same study sample. For example, findings from this study revealed that contact experience was the most powerful predictor compared to other predictors, since its regression coefficient was much larger than others. However, this result cannot be observed in studies assessing only one predictor of attitudes toward lesbians and gay men.

4.3 Predictors of attitudes toward bisexuals

As compared to the predictors of attitudes toward homosexuals, there were only two factors associated with attitudes toward bisexuals. Figure 9 (below) summarizes the results of predictors of negative attitudes toward bisexuals. Having a more traditional view of gender and a lower level of knowledge about homosexuality were significant predictors of negative attitudes toward bisexuals.



Figure 9: Predictors of negative attitudes toward bisexuals

Results from this study show inconsistency with previous literature in the factor, contact experience with LGB individuals. It did not show significant association with attitudes toward bisexuals, while it has been observed repeatedly in previous studies (Herek, 2002; Steffens & Wagner, 2004). Prior research has shown that knowing a LGB individual makes heterosexuals feel less negative toward bisexuals. However, this finding was not observed in this study.

One possible explanation for this conflicting result is the invisibility of bisexuals in the context of China. Because homosexuality is highly stigmatized in China (Zhang & Chu, 2005; Liu & Choi, 2006; Feng et al., 2010), bisexuals may behave as heterosexuals to

avoid losing their social integrity. It is difficult for heterosexual individuals to identify/suspect the existence of bisexual individuals since bisexuals are more likely to exaggerate their heterosexual behavior, while hiding the homosexual behaviors (McLean, 2008; Hayfield et al., 2014). Therefore, participants in this study who reported having contact experience with LGB individuals may be more likely to know a lesbian or a gay individual, rather than a bisexual individual in their life.

Results from this study also show inconsistency with previous literature in predictors of attitudes toward bisexuals. Previous literature revealed that attitudes toward bisexuals could be predicted by the same factors as attitudes toward lesbians and gay men (Herek, 2002; Steffens & Wagner, 2004). However, this is not the case in this study. Although the predictors of attitudes toward lesbians and gay men shared some similarities with the predictors of attitudes toward bisexuals, they were not completely the same.

One possible explanation for having different predictors for attitudes toward LGB groups is that participants in this study have more highly developed and articulated attitudes toward homosexual individuals, compared to bisexual individuals, since the homosexual individuals have greater visibility in society. In addition, the small regression coefficients of factors associated with attitudes toward bisexuals suggest that some key factors of heterosexuals' attitudes toward bisexuals were not assessed in this study.

4.4 Confucian values in attitudes toward LGBs

4.4.1 Homosexuality as violation of family values

Family values predicted heterosexuals' attitudes toward lesbians and gay men, while it did not predict attitudes toward bisexuals. This finding is consistent with the results from Feng et al (2012) study, in that individuals who scored more traditional on family values tend to have more negative attitudes toward lesbians and gay men. Confucian values have influenced Chinese society for many years. Confucianism has a heavy emphasis on family and filial piety, in that having children is a necessary duty to continue family lineage (Park & Chesia, 2007). Therefore, compared to bisexuals, homosexual individuals can be viewed as challenging the traditional family structure as well as Confucian values in the context of China (Adamczyk & Cheng, 2015). As a result, individuals who hold a traditional view of family are more likely to find homosexuals problematic, rather than bisexuals.

4.4.2 Curvilinear relationships between knowledge of reproduction and attitudes toward LGBs

In this study, the results of the association between knowledge about reproduction and attitudes toward LGB individuals conflict with findings from previous literature (Feng et al., 2012). The level of knowledge about reproduction was not significantly associated with attitudes toward LGB individuals in this study. Interestingly, it showed a curvilinear relationship with attitudes toward LGB individuals when treated as a categorical variable. Individuals who had *no* knowledge

about reproduction, and individuals who had a *high* level of knowledge about reproduction were likely to hold less negative attitudes toward LGB individuals.

However, individuals who had *some* level of knowledge about reproduction were likely to hold more negative attitudes toward LGB individuals.

Contrary to the results of this study, Feng et al (2012), who treated the factor knowledge about reproduction as a categorical variable found a positive linear relationship between knowledge about reproduction and attitudes toward homosexuals. Increased knowledge about reproduction was a predictor of a more positive view of homosexuality. It should be noted two major differences between this study and Feng et al study. First, the sample in this study was relatively smaller, compared to the previous study conducted by Feng et al (2012). Specifically, the large sample size (i.e., 6299 participants) of the Feng et al (2012) study may increase the possibility of statistical significance. Secondly, this study included not only the attitudes toward lesbians and gay men, but also the attitudes toward bisexuals, as compared to Feng et al, which assessed only attitudes toward homosexuals. Therefore, variation in the study sample size as well as characteristics of the scales may explain the different results.

4.5 Different set of predictors by sex of participant

The third major finding from this study was that there were different sets of predictors of negative attitudes toward LGB individuals by sex. Specifically, when separating the study population by different sex groups, there were differences in

predictors of negative attitudes toward LGB individuals. More factors associated with negative attitudes remained statistically significant in females compared to those in males. The findings suggest that some key factors that there may be other factors that influence heterosexual males' attitudes toward LGBs, which were not assessed in this study.

No interaction effect by sex was found in this study population. Given the absence of existing evidence on effect modification by sex, the reason why no interaction effect by sex is unclear. One possible explanation is that the study did not have enough power to detect the difference of association between select factor and attitudes by different sex groups. It should be noted that there were only 40 samples in male group, but near 70 samples in female group in this study.

4.6 Implications for policy and practice

The findings from this study may be particularly useful for LGB stigma reduction efforts in China. Predictors identified in this study can be utilized in interventions to improve social acceptance of LGB individuals in China. Specifically, given the fact that contact experience is the most powerful predictor of attitudes toward lesbians and gay men, interventions that can increase interaction between heterosexuals and homosexuals may be particularly useful in improving positive attitudes toward lesbians and gay men in China. In addition, since the gender roles as well as knowledge about homosexuality are consistent predictors of attitudes toward LGB groups,

interventions that increase education, including knowledge about homosexuality and equality of the genders, may be particularly valuable in developing friendlier attitudes toward LGB individuals.

4.6.1 Prior targets of LGB stigma reduction Interventions

Medical professionals, including doctors, nurses, social workers, medical students and interns in China, should be targeted for stigma reduction interventions because their attitudes may affect the quality of health care to their LGB patients.

Medical professionals who hold negative attitudes toward LGB individuals have been found to provide inadequate health care service for LGB patients (Eliason, 1996; Steven & Hall, 1988). Fear of discrimination from medical professionals is also a barrier that prevents LGB patients from health-seeking behaviors including HIV testing (Pyun et al., 2014; Wei et al., 2015). In addition, lack of disclosure about one's sexual orientation to medical professionals decreases the likelihood of receiving appropriate treatment and health services (Cahill & Makadon, 2014; Petroll & Mosack, 2011). It is necessary for medical professionals to hold friendlier attitudes toward LGB individuals in order to provide comprehensive and appropriate care for their LGB patients.

The Chinese government as well as China CDC should collaborate with local health facilities, medical schools, or community clinics to pilot interventions that can increase both contact and education for their employees and students. The feasibility and acceptability should be evaluated after the implementation of the intervention. If the

results were promising, government officers and public health policymakers should consider drafting guidelines on inclusion of both contact and education training in the Chinese medical field.

4.6.2 Scale & Model of LGB stigma reduction interventions

Given the fact that more research studies are needed to launch an LGB stigma reduction intervention at national level, interventions at the facility or community level are considered to be the most effective type currently. For interventions at the facility level, it can occur within specific settings, such as hospitals, primary care centers and schools to target a specific group of people such as medical professionals, public health professionals, and students. For interventions at the community level, it can be carried out amongst smaller groups of people with cooperation with LGB serving organizations and charities.

Similar with the study proposed LGB stigma reduction interventions, interventions for reducing stigma toward mental illness have found that contact and education had impact on stigma reduction (Corrigan et al., 2012). Specifically, education workshop providing mental health literacy had strong impact on reducing stigma for individuals with mental illness in a short term, while direct face-to-face interaction including hearing personal story had a longer impact on improving positive views of individuals with mental illness (Pinford et al., 2003; Eaton & Agomoh, 2008).

However, it should be noted that many interventions for reducing stigma toward mental illness were conducted in high-resource setting with different objectives.

Questions like “whether these interventions show same effectiveness for LGB stigma reduction,” “whether these intervention are affordable in the context of China” and “how far these are sustainable” should be considered before implementation.

4.7 Implications for further research

One focus for further research should be repeatedly confirming the results of this study by including a larger national representative sample. The author is aware of the difficulty about collecting data from a representative sample in China since LGB issues are considered socially sensitive in China. However, further research efforts should involve collaboration with local and international organizations such as China CDC as well as WHO Representative Office in China to obtain relatively representative samples. Given the social and economic differences between rural and urban areas in China, future research might first investigate heterosexuals’ attitudes toward LGB individuals in major cities in China, since they have more resources than rural areas in China.

In addition, research is needed to describe in qualitative terms how heterosexuals view lesbians, gay men, and bisexuals. Although this study provided quantitative estimates of young heterosexual adults’ attitudes toward LGB individuals, it does not explain how heterosexuals conceptualized LGB individuals. Since LGB individuals and the term “homosexuals” started appearing in Chinese mass media in recent years,

people are likely only now beginning to articulate their attitudes toward these groups. Future studies should describe heterosexuals' attitudes qualitatively to identify unique factors related to rejection of LGB individuals in the context of China, and to identify opportunities to promote acceptance and inclusion of LGBs.

Although contact experience with LGB individuals showed the strongest association with attitudes toward lesbians and gay men, some questions remain unanswered. Are those contact experiences good or bad experience? How does the quality of contact experience affect attitudes toward LGB individuals? How does the frequency of contact experience affect attitudes toward LGB individuals? What type of contact experiences are they (i.e., contact experience with lesbians, or gay men, or bisexuals)? Do different types of contact experiences affect heterosexuals' attitudes toward different groups of sexual orientation? Discovering the answers behind these questions would be an interesting endeavor for further research.

4.8 Study strengths and limitations

This study has several strengths. First, socially sensitive questions obtained by the web-based application, REDCap, enhanced the confidentiality and reliability of data. Secondly, parallel versions of the three sub-scales measuring attitudes toward different groups of sexual orientation allowed for direct comparisons of attitudes toward lesbians, gay men, and bisexuals.

However, some potential limitations of this study need to be considered. Firstly, because this was a cross-sectional study, the results from this study cannot determine the causal relationship between factors and negative attitudes toward LGB individuals. Secondly, since snowball-sampling methods and an Internet-based questionnaire were utilized in this study, selection bias may occur in the study. Specifically, in terms of external validity, because the first seeds of this study lacked variation since most individuals were selected from students and faculty members at Chongqing Medical University, the results cannot be generalized to the overall population in China. Furthermore, the author assumes that since the participants in this study were young individuals with higher levels of education, their attitudes toward LGB individuals may be friendlier than the general population. In terms of internal validity, the use of an Internet-based questionnaire may have excluded individuals without familiarity with or access to electronic devices. Individuals who are not familiar with the Internet may be more conservative, and have more negative attitudes toward LGB individuals compared to the study participants. Thirdly, the low Cronbach's alpha of the Family Values scale (Cronbach's alpha = 0.55) might represent a high error variance (i.e., 0.70) in the score. Alternatively, the low alpha might be due to the low internal consistency of the scale, or the number of items in the scale. If the measure includes a small number of items, the value of alpha is reduced (Streiner, 2003; Tavakoi & Dennick, 2011). Lastly, the study cannot differentiate between attitudes toward bisexual males and bisexual females, since

no distinction was made between males and females in attitudes toward bisexuals. It has been documented in other literature that attitudes toward bisexual males differs from attitudes toward bisexual females (Herek, 2002a).

5. Conclusion

In conclusion, this study is the first to assess the predictors of attitudes toward LGB individuals among heterosexual young adults in China. The finding from this study suggests that the view of gender roles and knowledge about homosexuality are consistent predictors of negative attitudes toward LGB individuals. Contact experience with LGB individuals is the most powerful predictor of attitudes toward homosexuals. An improvement in the attitudes toward LGB individuals to reduce stigma and alleviate health disparities among LGBs requires that greater attention be paid to the popularization of knowledge about homosexuality, equality of the genders, and personal interaction with LGB individuals.

LGB stigma reduction interventions should be developed and implemented in collaboration with local or international organization including the Chinese government, China CDC, WHO representative office in China, and LGB serving organizations. Interventions should aim to change attitudes toward LGBs and to reduce the pressure from Chinese society that has been dominated by Confucianism for centuries. Initially, interventions can be implemented and evaluated at a relatively small scale, at the levels of the facility or community, in order to assess their affordability and acceptability. If the

results were promising, researchers can consider a scale-up of a evidence-based intervention at national level.

This study provides some evidence that encourages the Chinese government to support the research of LGB issues by providing funding opportunities for researchers. Since LGB individuals and the term “homosexuality” appear more often on mass media in China, the general population has a greater opportunity to interact with LGB individuals, as compared with past generations. It is crucial to understand heterosexuals’ attitudes, and analyze the factors related to negative attitudes of LGB individuals in order to create a more harmonious society (Chan, 2010).

Appendix A

Supplemental table 1: The negative attitudes toward lesbians with percentage based on category

No	Statement	Strongly disagree		Disagree somewhat		Neither agree nor disagree		Agree somewhat		Strongly agree	
		n	%	n	%	n	%	n	%	n	%
1	I think lesbians are disgusting.	45	41.28%	19	17.43%	33	30.28%	7	6.42%	5	4.59%
2	Female homosexuality is a perversion.	49	44.95%	16	14.58	33	30.28%	6	5.50%	5	4.59%
3	Female homosexuality is a natural experssion of sexuality in women.	19	17.43%	14	12.84%	35	32.11%	24	22.02%	17	15.60%
4	Sex between two women is just plain wrong.	48	44.04%	16	14.68%	31	28.44%	8	7.34%	6	5.50%
5	Female homosexualaity is merely a different kind of lifestyle that should not be condemned.	10	9.17%	3	2.75%	22	20.18%	18	16.51	56	51.38%

Supplemental table 2: The negative attitudes toward gay men with percentage based on category

No	Statement	Strongly disagree		Disagree somewhat		Neither agree nor disagree		Agree somewhat		Strongly agree	
		n	%	n	%	n	%	n	%	n	%
1	I think male homosexuals are disgusting.	38	34.86%	15	13.76%	30	27.52%	13	11.93%	13	11.93%
2	Male homosexuality is a perversion.	48	44.04%	13	11.93	29	26.61%	7	6.42%	12	11.01%
3	Male homosexuality is a natural experssion of sexuality in men.	22	20.18%	11	10.09%	34	31.19%	25	22.94%	17	15.60%
4	Sex between two men is just plain wrong.	44	40.37%	16	14.68%	30	27.52%	7	6.42%	12	11.01%
5	Male homosexualalaity is merely a different kind of lifestyle that should not be condemned.	8	7.34%	5	4.59%	19	17.43%	17	15.60%	60	55.05%

Supplemental table 3: The negative attitudes toward bisexuals with percentage based on category

No	Statement	Strongly disagree		Disagree somewhat		Neither agree nor disagree		Agree somewhat		Strongly agree	
		n	%	n	%	n	%	n	%	n	%
1	I think bisexuals are disgusting.	33	30.28%	17	15.60%	32	29.36%	9	8.26%	18	16.51%
2	Bisexuality is a perversion.	39	35.78%	15	13.76	33	30.28%	6	5.50%	16	14.68%
3	Bisexuality is a natural experssion of sexuality in women.	21	19.27%	10	9.17%	40	36.70%	13	11.93%	25	22.94%
4	Sex with both men and women is just plain wrong.	28	25.69%	19	17.43%	34	31.19%	10	9.17%	18	16.51%
5	Bisexuality is merely a different kind of lifestyle that should not be condemned.	18	16.51%	9	8.26%	26	23.85%	15	13.76	41	37.61%

Appendix B

Online Consent Form

You are being asked to participate in a survey research project being conducted by Yan Huo, a graduate student at Duke University, with the help of Chongqing Medical University students. The response sheet will not ask any your identified information, and your response will be used only for academic research purpose. You must be at least 18 years of age to participate in this study.

The purpose of this study is to investigate the general population's attitudes toward lesbian, gay man, and bisexual (LGB) group. You will be asked to your attitudes toward gender roles, family values, LGBs, and the knowledge of reproduction and LGBs. You will be also asked demographic information. The questionnaire includes 7 sections and typically takes approximately 10 minutes to finish all sections. You may find that some of our questions are of a personal or sensitive nature, but we hope you are not upset or offended by what we ask.

If you agree to take the survey, please check "Yes" and go to the next page to start answering questions. You may choose to skip any questions you do not want to answer, or stop responding at any time for any reason. If you choose to not take the survey, please close this web page.

Thank you for your cooperation.

9,001RMB ~

S2. Please indicate your level of agreement or disagreement with each of these statements regarding your **attitudes toward LGBs**. Place check the box of your answer.

Strongly disagree = 1

Disagree somewhat = 2

Neither agree nor disagree = 3

Agree somewhat = 4

Strongly agree = 5

1. I think male homosexuals are disgusting.
1 2 3 4 5
2. Male homosexuality is a perversion.
1 2 3 4 5
3. Male homosexuality is a natural expression of sexuality in men.
1 2 3 4 5
4. Sex between two men is just plain wrong.
1 2 3 4 5
5. Male homosexuality is merely a different kind of lifestyle that should not be condemned.
1 2 3 4 5
6. I think lesbian are disgusting.
1 2 3 4 5
7. Female homosexuality is a perversion.
1 2 3 4 5
8. Female homosexuality is a natural expression of sexuality in women.
1 2 3 4 5
9. Sex between two women is just plain wrong.
1 2 3 4 5
10. Female homosexuality is merely a different kind of lifestyle that should not be condemned.
1 2 3 4 5
11. I think bisexuals are disgusting.
1 2 3 4 5
12. Bisexuality is a perversion.
1 2 3 4 5

13. Bisexuality is a natural expression of sexuality in both men and women.
 1 2 3 4 5
14. Sex with both men and women is just plain wrong.
 1 2 3 4 5
15. Bisexuality is merely a different kind of lifestyle that should not be condemned.
 1 2 3 4 5

S3. Please indicate your level of agreement or disagreement with each of these statements regarding your **attitudes toward gender**. Place check the box of your answer.

Disagree completely = 1
 Disagree somewhat = 2
 Neither agree nor disagree = 3
 Agree somewhat = 4
 Agree completely = 5

1. Everything should be geared toward assuring that as many women as men are employed in all professions.
 1 2 3 4 5
2. It looks worse for a woman than for a man to be drunk.
 1 2 3 4 5
3. A woman who has children should be a mother before all else.
 1 2 3 4 5
4. I think it is wrong that the media (newspapers, television) pay more attention to men's sports than to women's sports.
 1 2 3 4 5
5. It is not appropriate for a woman to tell dirty jokes.
 1 2 3 4 5
6. It is ridiculous for a woman to help a man put on his coat.
 1 2 3 4 5
7. It is acceptable for a woman to have a career, but marriage and family should come first.
 1 2 3 4 5
8. I think feminism is an important cause.
 1 2 3 4 5
9. A woman must insist that the domestic chores be divided equally between the two spouses. 1 2 3 4 5
10. A woman should not attempt to take on all kinds of typically male tasks.
 1 2 3 4 5

11. A man who easily becomes emotional and breaks into tears is a softie.
1 2 3 4 5
12. It annoys me that men are better off than women in all possible respects.
1 2 3 4 5
13. As long as men dominate in our society, it's not possible for women to be really happy.
1 2 3 4 5
14. From the beginning of a relationship, a woman has to be careful that she isn't pushed into the traditional female role.
1 2 3 4 5
15. The development of traditional gender roles is a logical consequence of getting married and having children.
1 2 3 4 5
16. It is best to maintain more or less traditional gender roles in a relationship.
1 2 3 4 5

S3. This session consists of 11 questions regarding your **attitudes toward family**. Please indicate your level of agreement or disagreement with each of these statements.

1. One's family must be the main source of trust and dependence.
Disagree No opinion Agree
2. One need not conform to one's family's or society's expectations.
Disagree No opinion Agree
3. One's achievements should be viewed as family's achievement.
Disagree No opinion Agree
4. The worst thing one can do is to bring disgrace to one's family reputation.
Disagree No opinion Agree
5. Occupational failure does not bring shame to the family.
Disagree No opinion Agree
6. Regardless of what faults one's parents may have, one must always respect them.
Disagree No opinion Agree
7. I had a lot of respect for my parents' ideals and opinions when I was growing up.
Disagree No opinion Agree
8. Even if one disagrees with one's parents, one must always do what they suggest.
Disagree No opinion Agree
9. When choosing husband/wife, who do you think should make decision?

(Code is *disagree* if the couple themselves made decision independently, else *agree*.)

Disagree No opinion Agree

10. It is important to you that your parents are proud of you.

Disagree No opinion Agree

11. Children needn't care for parents when they are unable to care for themselves.

Disagree No opinion Agree

S4. Please indicate your level of agreement or disagreement with each of these statements regarding the **knowledge about LGBs**. Place a circle in the box of your answer.

1. A majority of homosexuals were seduced in adolescence by a person.
TRUE FALSE
2. Sexual orientation is usually well established by adolescence.
TRUE FALSE
3. The homosexuals usually disclose their sexual identity to a friend before they tell a parent.
TRUE FALSE
4. A homosexual person's gender identity does not agree with his/her biological sex.
TRUE FALSE
5. If children are raised by openly homosexual parents, the likelihood that they themselves will develop a homosexual orientation is greater than if they were raised by heterosexual parents.
TRUE FALSE
6. Gay men and lesbian women have an increased incidence of anxiety and depression compared to heterosexual men and women.
TRUE FALSE
7. Homosexual place more importance on the physical attractiveness of their dating partners than do heterosexuals.
TRUE FALSE
8. The experience of love is similar for all people regardless of sexual orientation.
TRUE FALSE
9. Gay male couples are likely to have the most permissive attitudes about sexual activity outside of a committed relationship compared to lesbian couples and heterosexual couples.
TRUE FALSE
10. In some cultures, it is normal practice for boys to have sex with their same-gender during adolescence.
TRUE FALSE
11. If the world as a whole, the most common mode of transmission of the HIV virus is through gay male sex.
TRUE FALSE
12. Most homosexual men and women want to be heterosexual.
TRUE FALSE
13. Most homosexuals want to encourage or entice others into a homosexual or gay

lifestyle.

TRUE FALSE

14. Heterosexual teachers, more often than homosexual teachers, seduce their students or sexually exploit them.

TRUE FALSE

15. Heterosexuals generally have a stronger sex drive than do homosexuals.

TRUE FALSE

16. The homosexual population includes a greater proportion of men than of women.

TRUE FALSE

17. Heterosexual men and women commonly report homosexual fantasies.

TRUE FALSE

18. If the media portrays homosexuality or lesbianism as positive, this could sway youths into becoming homosexual or desiring homosexuality as a way of life.

TRUE FALSE

19. Homosexuals are usually identifiable by their appearance or mannerisms.

TRUE FALSE

20. Homosexuals do not make good role models for children and could do psychological harm to children with whom they interact as well as interfere with the normal sexual development of children.

TRUE FALSE

21. Gay men are more likely to be victims of violent crime than the general public.

TRUE FALSE

22. Homosexuality does not occur among animals.

TRUE FALSE

23. Historically, almost every culture has evidenced widespread intolerance towards homosexuals, viewing them as "sick" or as "sinners".

TRUE FALSE

24. Heterosexual men tend to express more hostile attitudes toward homosexuals than do heterosexual women.

TRUE FALSE

S5. This session consists of 21 questions regarding the **knowledge of reproductive health**. Please indicate your level of agreement or disagreement with each of these statements.

1. Even a very young girl can get pregnant if she has sexual intercourse after she has had her first period.

Disagreement Agreement

2. A girl can become pregnant even if she only has sex once.
Disagreement Agreement
3. A boy who has experienced a wet dream can make a girl pregnant.
Disagreement Agreement
4. A girl is most likely to get pregnant if her menstrual periods are regular in the middle of her menstrual cycle or about 14 days before menstruation.
Disagreement Agreement
5. Oral pills are effective contraceptive methods.
Disagreement Agreement
6. Condoms are effective contraceptive methods.
Disagreement Agreement
7. Intrauterine device is effective contraceptive methods.
Disagreement Agreement
8. Injection is effective contraceptive methods.
Disagreement Agreement
9. Implanon/Norplant are effective contraceptive methods.
Disagreement Agreement
10. Emergency contraception is effective contraceptive methods.
Disagreement Agreement
11. Medical sterilization is effective contraceptive methods.
Disagreement Agreement
12. Condoms can prevent STDs/AIDS.
Disagreement Agreement
13. Push out the air in the front tip bag and then put condom on penis.
Disagreement Agreement
14. Pull penis and condom out of vagina immediately after ejaculation.
Disagreement Agreement
15. Hold base of condom when withdrawing after ejaculation.
Disagreement Agreement
16. Emergency contraception must be taken within 3 days after intercourse.
Disagreement Agreement
17. Sexual intercourse can transmit HIV/AIDS.
Disagreement Agreement
18. Mother with HIV can transfer HIV to baby during delivery.
Disagreement Agreement
19. Even a single unprotected sexual intercourse may make people get HIV infected.
Disagreement Agreement
20. A person infected with an untreated STD could become infertile.
Disagreement Agreement

S6. This session will ask you several personal questions regarding your **contact experience** of LGBs. You can skip the question making you uncomfortable.

Do you have any friends, relatives, and close acquaintances who are homosexual?

YES

NO

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