

This is an electronic reprint of the original article. This reprint may differ from the original in pagination and typographic detail.

An Experiment Using a Sexual Strategies Explanation to Alleviate Internalized Homophobia Among Men Who Have Sex With Men in China

Gao, Qianhui; Antfolk, Jan; Santtila, Pekka

Published in:
Evolutionary Psychology

DOI:
[10.1177/14747049231179151](https://doi.org/10.1177/14747049231179151)

Published: 01/01/2023

Document Version
Final published version

Document License
CC BY

[Link to publication](#)

Please cite the original version:

Gao, Q., Antfolk, J., & Santtila, P. (2023). An Experiment Using a Sexual Strategies Explanation to Alleviate Internalized Homophobia Among Men Who Have Sex With Men in China. *Evolutionary Psychology*, 21(2), 1-12. <https://doi.org/10.1177/14747049231179151>

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

An Experiment Using a Sexual Strategies Explanation to Alleviate Internalized Homophobia Among Men Who Have Sex With Men in China

Qianhui Gao¹ , Jan Antfolk²  and Pekka Santtila^{1,3}

Abstract

Some men who have sex with men (MSM) having more casual sex and sexual partners is interpreted to be a sign of mental disorder and used to justify negative attitudes toward them by some. MSM may internalize this attitude causing internalized homophobia (IH). According to the sexual strategies theory, MSM having more casual sex is the result of differences between men's and women's sexual strategies and is unrelated to sexual orientation. We investigated whether this explanation would reduce IH and improve mental health in MSM. We recruited 255 Chinese MSM online using Wenjuanxing, Douban, Weibo, Tieba, and Blued and divided them using simple randomization into an experimental group ($n = 77$; sexual strategies explanation provided), an active control group ($n = 99$; minority stress explanation provided), and a control group ($n = 79$; no intervention) with pretest ($N = 255$); a 1 week post-test ($n = 195$); and a 1 month follow-up test ($n = 170$) of outcome measures. IH, mental distress (MD), short-term mating orientation, and risky sexual behaviors were measured online. The data were analyzed by SPSS 28. IH was associated with MD while being married was associated with IH and sexual contact with women with both more IH and MD as were not being masculine and self-identifying as straight. The sexual strategies explanation reduced IH related to pathologizing sexual behaviors and high-risk sexual behaviors while the minority stress explanation reduced MD. Providing a sexual strategies explanation may be used to de-stigmatize casual sex among MSM.

Keywords

internalized homophobia, sexual strategies theory, men who have sex with men, gay men, mental distress

Date received: 1 November 2022; Revision Submitted: 15 May 2023; accepted 15 May 2023

Introduction

Compared to heterosexual men, men who have sex with men (MSM) have a heightened risk for mental distress (Meyer, 2003) at least partly because of internalized homophobia (IH; Xu et al., 2017). IH describes individuals incorporating external prejudicial attitudes toward homosexuality into their self-concept and self-evaluation (Meyer, 2003), causing mental distress such as anxiety and depression (Heiden-Rootes et al., 2018; Meyer, 1995, 2003). Also, IH is associated with more risky sexual behaviors, such as having unprotected sex (Emler et al., 2015; Parmenter et al., 2019). MSM on average engage in more sexual activities (Ying et al., 2023) and have more sexual partners during their lifetime (Glick et al., 2012). One message MSM may internalize is this behavioral pattern signaling a lack of control over their sexual behaviors (Pinsof & Haselton, 2016, 2017; Reddick et al., 2016).

However, from the perspective of sexual strategies theory, MSM engaging in more casual sex is a result of the different mating strategies men and women tend to adopt (Buss, 2016; Symons, 1979; Trivers, 1972), unrelated to sexual orientation *per se*. Women have higher potential costs associated with

¹School of Psychology and Cognitive Science, East China Normal University, Shanghai, China

²Faculty of Arts, Psychology, and Theology, Åbo Akademi University, Turku, Finland

³New York University Shanghai, Shanghai, China

Corresponding Author:

Qianhui Gao, School of Psychology and Cognitive Science, East China Normal University, 3663 North Zhongshan Road, Putuo, Shanghai 200333, China.
 Email: alicegao1994@gmail.com



sexual activities, such as pregnancy and subsequent breastfeeding, while men might invest as little as one sexual act (Buss, 2016; Trivers, 1972). Also, the maximum number of offspring a woman can have is limited to only a few whereas for men it is potentially unlimited (Trivers, 1972). Consequently, women are on average more restrictive with sex and heterosexual men's interest in sex is limited by women's more restrictive attitudes. In MSM encounters, all partners are relatively more interested in sex, thus, actual sexual activities are more likely to happen without there necessarily being any difference in motivation to have casual sex between MSM and straight men (Glick et al., 2012; Trivers, 1972).

How an individual interprets a fact decides their reaction to the fact (Frijda, 1986; Smith & Lazarus, 1993). Thus, we believe providing this explanation to MSM will work as an effective intervention to reduce IH and mental distress by reducing the shame and guilt generated from any negative emotional reactions and thoughts they may have about their sexual behavior. Since decisions made when experiencing negative emotions are less rational (You et al., 2017), with the guilt and shame managed, we expect MSM provided with this intervention would be more likely to make decisions that serve their needs better.

Traditionally, to reduce IH and mental distress related to MSM's sexual behaviors, professionals provide an explanation of how sexual behaviors were shaped by the unique challenges MSM may face in a heterosexist society from the Minority Stress perspective (Kashubeck-West et al., 2008). For example, some MSM use sex to release stress caused by social prejudice (Kashubeck-West & Szymanski, 2008). However, it may be argued that this perspective actually reinforces the sex-negative and biased idea that MSM being sexually active is deviant and requires regulation (Kraus et al., 2016). Compared to the traditional intervention based on minority stress theory, a sexual strategies theory explanation provides MSM an alternative interpretation of causal sexual encounters in a de-pathologizing and positive way. Therefore, we argue that including the sexual strategies theory explanation addresses a limitation of the traditional, minority stress theory, intervention.

In addition, gender expression and sexual identity may also result in stress for MSM. Many people express negative emotions against individuals who violate traditional gender norms and roles (Wellman et al., 2021; Wellman & McCoy, 2014). MSM who are not traditionally masculine may therefore receive more hostile reactions from others which may aggravate IH and mental distress. Men who have sex with other men but identify as straight may be especially prone to IH and mental distress because of unclear self-concept (Li et al., 2016). These factors may be especially relevant in China where many men sexually attracted to men marry with women (Ren et al., 2019).

In the current study, we are going to investigate the following hypothesis:

Hypothesis 1: (a) More IH would be associated with more mental distress and (b) both would be associated with more risky sexual behaviors.

Hypothesis 2: A sexual strategies theory explanation would reduce (a) IH and (b) risky sexual behavior compared to a minority stress explanation and no explanation control group.

Hypothesis 3: A minority stress explanation would reduce mental distress compared to a no explanation control group.

Hypothesis 4: (a) Being older, (b) having less traditional gender expression, (c) self-identifying as straight, and (d) being married would be associated with more IH and mental distress.

Method

Participants

The present experiment was conducted from June to July 2021. In total, 304 men participated in the pretest. However, 45 participants did not pass the attention checks while four participants did not participate in the post-test, therefore, their responses were removed. The final dataset included 255 participants in the pretest, 195 participants in the post-test, and 170 participants in the follow-up test. There was no missing data besides the responses that were excluded from the analyses.

The pretest was an online questionnaire that asked about demographic information and assessed IH, mental distress, short-term mating orientation, and risky sexual behaviors before intervention. The post-test was an online questionnaire that reassessed the levels of IH and mental distress 7 days after the intervention. The follow-up test was an online questionnaire that assessed IH, mental distress, short-term mating orientation, and risky sexual behaviors 1 month after the intervention.

The participants were recruited online through social media and dating apps in China, including Douban (www.douban.com), Weibo (www.weibo.com), Tieba (tieba.baidu.com), and Blued (www.blued.com). The target sample was Chinese adult cisgender men who had had sex with other men at least once.

Chinese adult cisgender men who had sex with other men at least one time and passed the attention were included in the analyses. Individuals who did not meet the criteria were excluded. This information was collected at the beginning of the pretest phase of the study. The attention check consisted of four factual questions concerning each intervention. The participants needed to indicate that they understood the interventions by answering at least two of these questions correctly.

The participants were assigned to the sexual strategies theory explanation, the minority stress explanation, or the no explanation control group using simple randomization based on their date of birth (i.e., participants who were born between 1st to 10th of any month were assigned to the sexual strategies theory group, those born between 11th to 20th were assigned to the minority stress group, and those born between 21st to 31st were assigned to the control group). This randomization procedure was necessary due to limitations with the platforms used to collect data.

The Institutional Review Board of Shanghai New York University, 2021-002-NYUSH-Pudong approved this study. Informed consent was obtained from the participants online.

Instruments

Demographic Information. Descriptive information about the participants' age, sex, gender, gender expression, sexual identity, relationship status, and whether they ever had had sexual contact with a man and with a woman is reported in Table 1.

Internalized Homophobia. IH was assessed with the five-item short form of the Revised Internalized Homophobia Scale (IHP-R), $\alpha = .86$ (Herek et al., 2009). Also, we added four items that measured the individuals' attitudes toward their sexual behaviors: "6. I feel that my sexual behavior is a sign of psychological problems", "7. I would like to stop having sex with same-sex partners", "8. Having casual sex makes me feel bad about myself", "9. I feel that my sexual behavior is out of control", $\alpha = .80$. The combined scale with the nine items had an internal consistency reliability of .90. The

participants indicated their agreement with the statements on a Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Higher scores indicated higher levels of IH.

Mental Distress. Mental distress was assessed through a combination of a translated version of the Four-Dimensional Symptom Questionnaire ($\alpha = .99$; 4DSQ, Terluin et al., 2006), the General Anxiety Disorder-7 ($\alpha = .94$; GAD-7, Spitzer et al., 2006) that was translated into Chinese by He et al. (2010), and the Patient Health Questionnaire-9 ($\alpha = .93$; PHQ-9, Kroenke et al., 2001) that was translated into Chinese by Yeung et al. (2008).

The 4DSQ contains 50 items (Terluin et al., 2006). The 50 items are divided into four subscales including anxiety, depression, distress, and somatization. The response categories were *no, sometimes, regularly, often, very often, or constantly*. The responses were scored as 0 = *no*, 1 = *sometimes*, and 2 = *other responses*, and the item scores were summated to scale scores. The internal consistency reliability of the scale was .99.

The Chinese versions of the PHQ-9 (Kroenke et al., 2001; Yeung et al., 2008) and GAD-7 (He et al., 2010; Spitzer et al., 2006) are both self-administered questionnaires and have been widely used in the Chinese population. Each question was scored from 0 to 3 (0 = *not at all*; 1 = *several days*; 2 = *more than half of all the days*; 3 = *nearly every day*). The internal consistency reliability was .93 for the PHQ-9 and .94 for the GAD-7 in the current study.

We found that all of the mental distress measures were strongly positively associated with each other. We therefore conducted an exploratory factor analysis. All the correlations between the measures were above .71 and significant. The Kaiser-Meyer-Olkin (KMO) was .87 while Bartlett's test was significant. Also, all the values of the diagonal of the anti-image correlation matrix were over .60. This suggests that a factor analysis was appropriate. Further, the scree plot showed the presence of only one factor explaining 86.0% of the variance. We, therefore, created a summary score representing mental distress for use in subsequent analyses. Caspi et al. (2013) indicated that the structure of mental distress could be summarized into three core psychopathological dimensions: an internalizing liability, an externalizing liability, and a thought disorder liability. The internalizing liability stands for mental distress symptoms such as depression and anxiety. The externalizing liability stands for antisocial and substance use disorders while a thought disorder liability stands for symptoms of psychosis. The mental distress factor in the present study can best be described as measuring internalizing distress.

Short-Term Mating Orientation. To measure actual casual sex, we created items that asked "How many one-night stands have you had in the last month?", "How many sexual partners you did not know well have you had in the last month?", and "How many times have you had anonymous sex/sex with a person you have not known at all in the last month?", $\alpha = .89$. We winsorized eight outliers.

Table 1. Demographic Information for the Pretest.

Characteristics	N	%
Age ($M \pm SD$)	24.67 \pm 5.2	
Sex at birth		
Male	255	100
Gender		
Male	255	100
Gender expression		
Masculine or mostly masculine	206	80.8
Feminine or mostly feminine	28	11
Both masculine and feminine	21	8.2
Sexual identity		
Homosexual	179	70.2
Bisexual	65	23.9
Heterosexual	13	5.1
Asexual	2	0.8
Relationship status		
Married	30	11.8
Divorced	2	0.8
Co-habiting	37	14.5
Dating	76	29.8
Single	138	54.1
Sexual contact		
With a man	255	100
With a woman	100	39.2
HIV status		
HIV tested	178	69.8
HIV carrier		
Yes	16	6.3
No	178	69.8
Don't know	61	23.9
Having intention to test HIV	137	53.7
PrEP status		
Never heard of PrEP	81	31.8
Never used	110	43.1
Has taken PrEP, but no longer on it	32	12.5
Currently on PrEP	32	12.5
Having intention to seek PrEP	32	12.5

HIV: human immunodeficiency virus; SD: standard deviation.

Risky Sexual Behaviors. Based on previous works (Jin et al., 2015; Kalichman & Cain, 2004; Kashubeck-West & Szymanski, 2008), we asked about the number of times the participants had engaged in the following two behaviors in the past month: unprotected receptive anal intercourse with a casual or one-time partner, and unprotected insertive anal intercourse with a casual or one-time partner, $\alpha = .73$. We winsorized five outliers.

We analyzed the risky sexual behavior related to sexually transmitted infections (STIs) overall and to human immunodeficiency virus (HIV) separately. To indicate STIs risky sexual behaviors, we calculated the sum of the times of the above two behaviors, $\alpha = .86$. To indicate HIV risky sexual behaviors, we identified participants who use PrEP and changed their frequency of risky sexual behaviors to "0," then, we recalculated the sum of the times of the above two behaviors, $\alpha = .86$.

HIV Status and PrEP Knowledge. HIV status was measured via three items: Have you got your HIV status tested (2 = *No*, 1 = *Yes*); Are you a carrier of HIV virus (2 = *No*, 1 = *Yes*, 3 = *Do not know*); Do you have any intention to get tested for HIV in the next 1 month (2 = *No*, 1 = *Yes*). Engagement with pre-exposure prophylaxis (PrEP) was evaluated here by The Progression Along the PrEP Continuum scale (Meanley et al., 2020). The progression along the PrEP continuum is a three-item scale and we used the same coding system that has been used in previous research to measure participants' engagement with PrEP. The items were modified to pertain to the past 1 month. Respondents first answered whether they had heard of PrEP (2 = *No*, 1 = *Yes*). Those who answered "Yes" were further asked to indicate their PrEP status (1 = *Never used PrEP*, 2 = *Has taken PrEP, but no longer on PrEP*, 3 = *Currently on PrEP*). Respondents who had never used PrEP were also asked whether they had any intention to use PrEP in the next month (2 = *No*, 1 = *Yes*).

Procedure

The questionnaires of the study were built on Wenjuanxing (www.wenjuanxing.com), a Chinese online survey platform. (See Figure 1 for a schematic presentation of the design.) We post the link and QR code of the pretest questionnaire on social media and dating apps in China. After clicking the link, the participants first saw the consent letter that explained the purpose, procedure, potential risks, and participants' rights in relation to the study. The participants were informed of the nature of the intervention, the procedure and how long each procedure would take, the potential risk and benefits of participation, their rights of leaving the survey at any time without any negative impact, and their rights of contacting the investigators or the Institutional Review Board of Shanghai New York University at any time if they have any questions or need to report any issue. Individuals needed to indicate they agreed with the consent letter to continue their participation. Then, the participants need to indicate their day of birth (without year and month). They were then assigned to a sexual strategies

theory explanation, minority stress explanation, or a no explanation control group based on their day of birth.

Participants in all three groups first completed the same pretest questionnaire. Then, the participants in the sexual strategies theory explanation group were shown a video that explained why MSM were more likely to engage in more casual sex from a sexual strategies perspective; the participants in the minority stress explanation group were shown a video that explained why MSM were more likely to engage in more casual sex from a minority stress perspective; the participants in the control group received no intervention.

The intervention videos were embedded at the end of the pretest questionnaire. The videos were prepared by the investigators based on sexual strategies theory (Buss, 2016; Trivers, 1972) and minority stress theory (Meyer, 1995, 2003). Each video was around 5 minutes. See Table 2 for details of the main contents of the videos.

On day 4 prior to the post-test, we sent reminders that summarized the main contents of the respective explanations to the sexual strategies theory and minority stress explanation groups via the phone number that they provided in the pretest. One week after the pretest, all participants were requested to complete the post-test. The link to the post-test was sent to the phone numbers the participants provided during the pretest.

Four weeks after the pretest, all participants were required to complete the follow-up test questionnaire online. After the follow-up test, all the intervention videos were shared with all the participants.

Statistical Analyses. The analyses were conducted using SPSS 28. Descriptive analyses were conducted to see the main characteristics of the sample. Bivariate correlations were conducted to investigate the associations. The one-way analysis of variances (ANOVAs) were conducted to investigate if the level of IH and mental distress differ among different gender expressions, sexual identity, HIV status, and PrEP status groups. Mixed ANOVAs were conducted to investigate the effect of time, intervention type, and interaction effect of time and intervention type on the dependent variables. Paired sample t-test were conducted to investigate pairwise differences between time points within the three (sexual strategies theory, minority stress, and control) groups.

Results

The reporting of the results was divided into three parts: main features of the sample; association analyses using responses obtained at pretest; and effects of the interventions. Given that some participants dropped out, the number of participants in the different analyses varied.

Descriptive Analyses

Characteristics. There were 255 valid responses on the pretest, 195 on the post-test, and 170 on the follow-up test.

All participants were cisgender men with a mean age of 24.7 (standard deviation [*SD*] = 5.2). Most participants identified

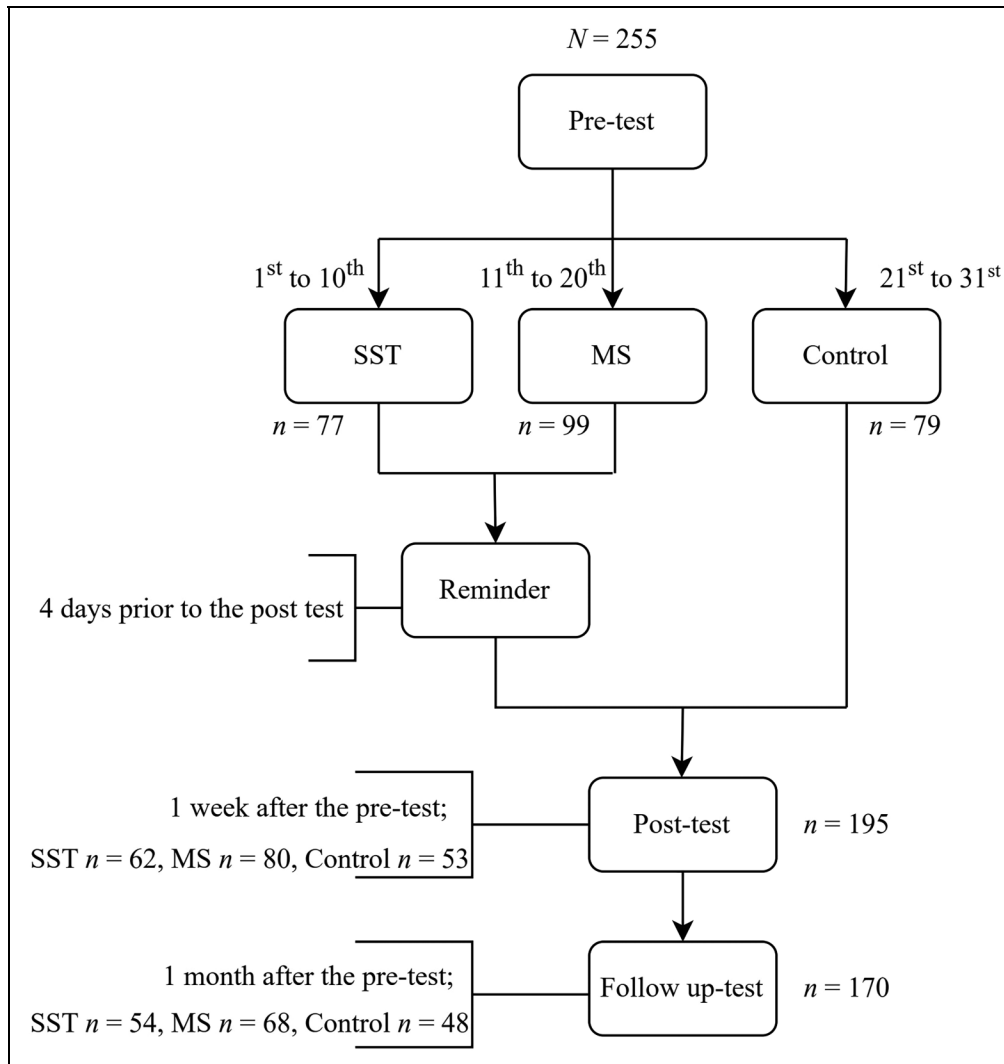


Figure 1. Schematic overview of the experimental procedure.

Table 2. Main Features of Both Interventions.

Group	Features of the intervention
Sexual strategies theory explanation (Buss, 2016; Trivers, 1972)	<ol style="list-style-type: none"> 1. Compared to women, there is less obligatory investment attached to the sexual activities of men. Therefore, men are less choosy regarding sexual activities. 2. Theoretically, men could have an unlimited number of offspring. Casual sexual activity therefore makes more sense for men. 3. Both gay and heterosexual men are relatively interested in casual sexual activities but heterosexual men’s sexual activity is limited by women’s more restrictive attitudes. 4. When it comes to two gay men, both may be relatively interested in casual sexual activities. Therefore, sexual activity is more likely to occur.
Minority stress (Kashubeck-West & Szymanski, 2008; Mimiaga et al., 2014; Pachankis et al., 2008; Parrish et al., 2019; Totenhagen et al., 2018)	<ol style="list-style-type: none"> 1. Individuals with internalized homonegativity are less likely to get information and resources about HIV/STIs from the community. 2. Internalized homonegativity increases self-destructive behavior. 3. Minority stress impairs the ability to establish same-sex intimate relationships. 4. Minority stress increases the needs for escapism. Sex provides an opportunity. 5. Sexual fantasies and behaviors help alleviate the negative emotions caused by minority stress, such as anxiety and depression. 6. Having sex with a casual partner helps individuals keep their sexual orientation hidden because there are less strings attached.

HIV: human immunodeficiency virus; STI: sexually transmitted infections.

themselves as gay, and around 10% of participants were married. Given that the sample is Chinese, these marriages would likely be with women because only heterosexual marriage is legal in China according to The Civil Code of the People's Republic of China which was adopted in 2020. All participants had had sexual contact with a man, while around half of the participants also reported sexual contact with a woman. Most participants had tested their HIV status and around 5% of the participants were carriers of HIV. Around 30% of participants had never heard of PrEP while around 10% of participants were currently on PrEP.

Mental Distress. For both GAD-7 and PHQ-9, scores of 5, 10, and 15 were taken as the cut-off points for "mild," "moderate," and "severe" distress, respectively (He et al., 2010; Zhang et al., 2013). More than half of our sample presented mild to severe anxiety symptoms while 7.8% ($n=20$) participants presented severe anxiety. More than half of our sample presented mild to severe depression symptoms while 15.3% ($n=39$) participants presented severe depression (see Table 3).

In terms of anxiety, depression, distress, and somatization measured by 4DSQ, the current sample presented higher levels of mental distress compared to all of the nonclinical samples that were investigated by Terluin et al. (2006).

Tests of Hypotheses Based on Responses From the Pretest

See Table 4 showing that more IH was associated with more of all types of mental distress measured in the current study, and

Table 3. GAD-7 and PHQ-9.

Category	Score	GAD-7		PHQ-9	
		<i>n</i>	%	<i>n</i>	%
No symptom	<5	126	49.4	103	40.4
Mild	5–9	68	26.7	65	25.5
Moderate	10–14	41	16.1	48	18.8
Severe	≥15	20	7.8	39	15.3
Total		255	100	255	100

GAD-7: General Anxiety Disorder-7; PHQ-9: Patient Health Questionnaire-9.

Table 4. Correlations for Internalized Homophobia and Mental Distress.

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7
1. Internalized homophobia	2.75	0.95	–						
2. Anxiety (GAD-7)	0.85	0.74	.483***	–					
3. Depression (PHQ-9)	0.84	0.72	.510***	.910***	–				
4. Anxiety (4DSQ)	0.67	0.66	.539***	.823***	.829***	–			
5. Depression (4DSQ)	0.62	0.71	.433***	.710***	.790***	.864***	–		
6. Distress (4DSQ)	0.80	0.63	.465***	.828***	.859***	.924***	.888***	–	
7. Somatization (4DSQ)	0.69	0.63	.546***	.766***	.790***	.889***	.763***	.849***	–

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

4DSQ: Four-Dimensional Symptom Questionnaire; GAD-7: General Anxiety Disorder-7; PHQ-9: Patient Health Questionnaire-9; SD: standard deviation.

all types of mental distress were positively associated with each other. Having more STIs-related risky sexual behaviors ($M=1.32$, $SD=2.47$) was associated with more mental distress ($M=0.75$, $SD=0.63$). Having more HIV-related risky sexual behaviors ($M=1.03$, $SD=2.19$) was also associated with both more IH ($M=2.75$, $SD=0.95$) and mental distress ($M=0.75$, $SD=0.63$). These results supported our expectations.

Intervention Effects

Overall Score of Internalized Homophobia. Table 5 shows that an effect of time was found in the overall score of IH. However, contrary to our hypothesis, the effect of the intervention, and the interaction effect of time and intervention were not significant. The overall score of IH decreased in both the short term and long term in the sexual strategies theory group, while only in the long term in the minority stress and control groups.

Single Items of Internalized Homophobia. Given that the sexual strategies theory explanation could be expected to be particularly effective on the aspects of IH related to pathologizing of sexual behavior, we decided to analyze the impact of the interventions on the single items of IH in an exploratory manner. Interaction effects of time and intervention type on item 4 ($F=2.609$, $p < .05$), item 6 ($F=2.623$, $p < .05$), item 8 ($F=2.992$, $p < .05$), and item 9 ($F=3.642$, $p < .01$) were found.

In the sexual strategies theory explanation group, declines in item 6 ("I feel that my sexual behavior is a sign of psychological problems.") and item 8 ("Having casual sex makes me feel bad about myself.") were found from t_0 to t_1 , and declines in item 4 ("I feel that being gay/ bisexual is a personal shortcoming for me."; Herek et al., 2009), item 6, and item 9 ("I feel that my sexual behavior is out of control.") were found from t_0 to t_2 . However, item 8 increased from t_1 to t_2 . In the minority stress explanation group, no significant change in IH items was observed. In the control group, there was an increase in items 4 and 6 from t_1 to t_2 (see Table 6).

These exploratory analyses were in line with our hypothesis: a sexual strategies theory explanation can reduce IH related to pathologizing sexual behavior compared to both minority stress explanation and no intervention control.

Table 5. Changes in Internalized Homophobia and Mental Distress as a Function of Intervention Type.

	Pre-test				Post-test				Follow up				ANOVA effects				Paired samples t-tests									
	M		SD		M		SD		M		SD		Time		Intervention		Time × intervention		Pre-post		Post-follow-up		Pre-follow-up			
Mental distress	0.75	0.63	0.60	0.55	0.68	0.65	11.307***	7.316***	2.708*	.156	.149	.014	.436***	-.368**	.285*	1.117***	.564***	.889***	.034	.500***	.760***	-.040	.261 ^a	-.351*	-.065	
Sexual strategies theory	0.51a	0.49	0.49a	0.44	0.45a	0.45																				
Minority stress	0.97b	0.68	0.74b	0.60	0.89b	0.71																				
Control	0.69c	0.60	0.54a,b	0.56	0.66a,b	0.66																				
Internalized homophobia	2.75	0.95	2.68	0.91	2.31	0.89	63.307***	1.778	1.609	.285*	1.336***	1.117***	.034	.564***	-.040	.285*	1.117***	.564***	.889***	.034	.500***	.760***	-.040	.261 ^a	-.351*	-.065
Sexual strategies theory	2.61a	0.79	2.56a	0.73	2.13a	0.68																				
Minority stress	2.92b	1.02	2.86a	1.03	2.51b	0.96																				
Control	2.41a,b	1.18	2.13a	1.04	0.24a,b	0.96																				

Note. ^a $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.
ANOVA: analysis of variance; SD: standard deviation.

Mental Distress. Table 5 shows that effects of time, intervention type, and an interaction effect of time and intervention type were found for mental distress.

In the sexual strategies theory explanation group, no significant change was observed over time. In the minority stress group, mental distress decreased from t0 to t1, but increased from t1 to t2. As a result, no significant change was observed from t0 to t2. In the control group, mental distress decreased from t0 to t1 and then increased from t1 to t2. As a result, mental distress increased from t0 to t2 even though the change was not significant.

Risky Sexual Behaviors. Table 7 shows that HIV and STIs risky sexual behaviors reduced from t0 to t2 in the sexual strategies theory explanation group even though the intervention type and time interaction was not significant. The hypothesis was partially supported.

Additional Analyses. Having sexual contact with a woman was associated with both more IH and mental distress. Older participants were more likely to be married ($M = 0.12$, $SD = 0.32$) or divorced ($M = 0.01$, $SD = 0.09$), and less likely to be dating ($M = 0.30$, $SD = 0.46$). Being married was associated with more IH. The masculine participants had the least IH while the participants who expressed their gender in both masculine and feminine ways had the most mental distress. Straight-identifying participants had more IH and mental distress than the gay and bisexual-identifying participants (see Table 8). These results partially supported the expectations.

More IH was associated with never hearing of PrEP, and having the intention to seek PrEP in the next 1 month. Having more mental distress was associated with having heard of PrEP before, and having the intention to seek PrEP in the next 1 month.

Short-term mating orientation behavior ($M = 3.55$, $SD = 6.01$) was associated with mental distress $r(253) = .20$, $p = .001$, STIs risky sexual behaviors $r(253) = .58$, $p < .001$, and HIV risky sexual behaviors $r(253) = .53$, $p < .001$.

Discussion

Features of Men Who Have Sex With Men

The current study shows that MSM have a higher level of mental distress than the nonclinical population, and more IH was associated with more mental distress. These are in line with previous studies that MSM experiences more mental distress than other populations and that IH is positively correlated with mental distress (Heiden-Rootes et al., 2018; Meyer, 1995, 2003). It may be because some people view sex between men, especially the tendency to have more casual sex or sexual partners (Ying et al., 2023), as a sign of losing control over sexual behaviors leading to an aversion to MSM (Kraus et al., 2016). Some MSM may internalize these negative and pathologizing attitudes, increasing the likelihood and extent of IH, causing mental distress such as anxiety and depression (Heiden-Rootes et al., 2018; Meyer, 1995, 2003).

Table 6. Changes in Single Items of IH.

	Pretest		Post-test		Follow up		ANOVA effects				Paired samples t-tests		
	M	SD	M	SD	M	SD	Time	Intervention	Time X intervention	Pre-post	Post-follow-up	Pre-follow-up	
IH 1	2.85	1.19	2.83	1.14	2.68	1.19	1.210	0.146	0.193	.039	.263 ^a	.149	
Sexual strategies theory	2.71a	1.07	2.74a	0.96	2.61a	1.00				-.069	.116	.092	
Minority stress	3.00a	1.20	3.01a	1.28	2.72a	1.31				.039	.000	.089	
Controls	2.78a	1.28	2.64a	1.08	2.69a	1.21							
IH 2	2.86	1.27	2.80	1.19	2.82	1.28	0.357	0.244	1.490	-.070	.213	.157	
Sexual strategies theory	2.69a	1.18	2.84a	1.01	2.63a	1.14				.092	-.216	-.099	
Minority stress	2.97a	1.31	2.86a	1.31	2.96a	1.32				.021	-.230	-.086	
Control	2.90a	1.29	2.66a	1.21	2.83a	1.36				.043	.116	.129	
IH 3	3.09	1.23	3.03	1.15	2.93	1.24	0.475	0.261	0.180	.000	.049	.098	
Sexual strategies theory	2.88a	1.11	2.84a	0.93	2.72a	0.98				-.076	.056	-.027	
Minority stress	3.18a	1.33	3.14a	1.25	2.97a	1.38				.110	.213	.332*	
Control	3.19a	1.21	3.08a	1.22	3.10a	1.28				.035	-.184	-.166	
IH 4	2.29	1.23	2.27	1.20	2.28	1.25	0.699	3.654*	2.609*	.000	-.318*	-.281 ^a	
Sexual strategies theory	2.05a	0.97	2.06a	0.96	1.85a	.88				.045	.128	.235	
Minority stress	2.59b	1.30	2.51b	1.41	2.62b	1.38				.017	-.209	-.136	
Control	2.16a	1.31	2.13a,b	1.06	2.29b	1.27				-.132	-.030	-.158	
IH 5	2.58	1.32	2.56	1.24	2.54	1.33	0.273	2.147	1.486	.346**	.235	.417**	
Sexual strategies theory	2.30a	1.18	2.32a	0.99	2.20a	1.05				.056	-.079	.000	
Minority stress	2.88b	1.35	2.76b	1.38	2.81b	1.47				.056	-.305*	-.147	
Control	2.48a,b	1.34	2.53a,b	1.23	2.52a,b	1.34				-.166	.167	.033	
IH 6	2.76	1.39	2.58	1.30	2.57	1.29	0.904	4.660*	2.623*	-.075	-.086	-.142	
Sexual strategies theory	2.67a,b	1.38	2.39a	1.09	2.19a	1.05				-.089	.176	.113	
Minority stress	3.02a	1.38	2.94b	1.41	2.96b	1.31				.379**	-.358*	.099	
Control	2.51b	1.36	2.28a	1.26	2.46a	1.38				.067	.016	.109	
IH 7	2.49	1.22	2.51	1.14	2.41	1.21	0.525	1.105	0.819	-.181	.334*	.198	
Sexual strategies theory	2.26a	1.12	2.40a	1.00	2.24a	0.97				.170	.302*	.470**	
Minority stress	2.68b	1.26	2.66a	1.28	2.63a	1.34				.040	-.140	-.157	
Control	2.49a,b	1.24	2.40a	1.04	2.29a	1.25				.159	-.080	.133	
IH 8	3.30	1.24	3.13	1.26	3.10	1.32	1.989	0.573	2.992*				
Sexual strategies theory	3.45a	1.18	3.06a	1.19	3.35a	1.31							
Minority stress	3.29a	1.25	3.15a	1.29	3.07a	1.30							
Control	3.15a	1.29	3.19a	1.32	2.85a	1.35							
IH 9	2.55	1.21	2.46	1.15	2.40	1.19	2.656 ^a	3.906*	3.642**				
Sexual strategies theory	2.43a	1.09	2.40a,b	0.91	2.09a	0.98							
Minority stress	2.78a	1.28	2.71a	1.32	2.79b	1.29							
Control	2.34a	1.18	2.13b	1.04	2.19a	1.14							

Note. ^a $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

ANOVA: analysis of variance; IH: internalized homophobia; SD: standard deviation.

Table 7. Changes in Risky Sexual Behaviors.

	Pretest		Follow up		ANOVA effects			Paired samples t-tests Pre-follow-up
	M	SD	M	SD	Time	Intervention	Time × Intervention	
HIV risk					6.045*	1.896	0.233	
Sexual strategies theory	0.67a	1.32	0.26a	0.94				0.41**
Minority stress	1.06a	2.30	0.79b	1.09				0.26
Control	0.87a	1.68	0.67b	1.23				0.21
STIs risk					5.915*	1.236	1.690	
Sexual strategies theory	1.06a	2.29	0.44a	1.24				0.61**
Minority stress	1.22a	2.31	1.22b	1.66				0.04
Control	1.35a	2.46	0.85a,b	1.26				0.54

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

HIV: human immunodeficiency virus; SD: standard deviation; STI: sexually transmitted infections.

Table 8. Differences in Internalized Homophobia and Mental Distress Among Different Subgroups of Participants.

Groups		Internalized homophobia		Mental distress	
		M	SD	M	SD
Gender expression	Masculine or mostly masculine	2.64a	0.96	0.72a	0.62
	Feminine or mostly feminine	3.28b	0.32	0.63a	0.61
	Both masculine and feminine	3.19b	1.05	1.19b	0.65
Sexual identity	Gay	2.55a	0.88	0.65a	0.57
	Bisexual	3.12b	0.92	0.91a,b	0.70
	Straight	3.83c	0.83	1.21b	0.73
HIV status	Carrier	2.70a	1.03	1.15a	0.68
	Not carrier	2.73a	1.02	0.75b	0.66
	Do not know	2.82a	0.70	0.63b	0.50

HIV: human immunodeficiency virus; SD: standard deviation.

Also, as expected, risky sexual behaviors such as having unprotected sex with casual partners were associated with more mental distress and IH. These behaviors may make people and MSM themselves feel sexual behaviors of MSM are out of control (Pinsof & Haselton, 2016, 2017; Reddick et al., 2016), causing mental distress and IH, and in turn, increasing risky sexual behaviors (Kashubeck-West & Szymanski, 2008; Tan, 2018).

Effectiveness of Interventions

As expected, the overall score of IH decreased in both the short term and long term in the sexual strategies theory group even though the intervention type and time interaction was not significant as we had hypothesized. Follow-up analyses showed that there were significant and expected changes especially in items of pathologizing sexual behaviors. Sexual strategies theory provided MSM a perspective to view their sexual behavior as a natural sexual preference and expression that served an adaptive function and realize that men in general would share the same preferences despite their sexual orientation (Buss, 2016; Trivers, 1972), instead of viewing it as a deviation from the

norm. It may help MSM de-pathologize and normalize their sexual behaviors, and as a result, reduce their IH and mental distress (Yanos et al., 2021).

In terms of mental distress, not much change was observed in the sexual strategies theory group. In the minority stress and control groups, an alleviation was observed in a short term; however, in a long term, from post-test to follow-up test, mental distress increased. It decreased in the short term first may be because the participants in the minority stress and control groups got an opportunity to attribute their sexual behaviors to the heterosexist environment or to reflect on their sexuality in a safe situation (Feasel et al., 2022). However, may be because the questions and interventions implicate that being a sexual minority may be a risky factor of discrimination, they may remind MSM the possibility of their sexual orientation causing trouble (Meyer, 2003). As a result, mental distress increased in the long term in these two groups.

In terms of risky sexual behaviors, sexual strategies theory reduced both STIs and HIV-related risky sexual behaviors in the long term. Given that risky sexual behaviors are associated with IH and mental distress, the intervention may have helped

the participants to regulate their negative emotions such as guilt and shame and, as a result, empowered them to manage the sexual behaviors that may put them at risk (You et al., 2017).

The results indicate that in addition to providing the traditional intervention from the minority stress perspective, providing sexual strategies explanation of sexual behaviors of MSM can help MSM increase self-acceptance and decrease the possibility of pathologizing their sexual behaviors, as a result, alleviate IH in a long term, and help them to reduce risky sexual behaviors.

The target population of the present study was men who had sexual contact with other men at least one time. Not surprisingly, those who identified themselves as heterosexual or bisexual and who had sexual contact with women had more mental distress and IH. A clear self-concept is a mediator and moderator of IH (Li et al., 2016). MSM who did not identify themselves as gay may have a less clear self-concept, as a result, may have more mental distress and IH (Li et al., 2016). Furthermore, the masculine participants demonstrated fewer mental distress and IH compared to participants of other gender expressions. It is consistent with the previous studies that MSM who are not masculine enough received more discrimination because they were perceived as violating both the traditional gender norms and gender roles, and it may cause mental distress and IH (Herek, 1988; Wellman & McCoy, 2014; Wellman et al., 2021).

Limitations

First, the current study was not able to explain whether simply reflecting on sexual orientation openly is already powerful to make a short-term change in the level of mental distress. Second, almost all the questions about mental distress focused on internalizing liability (Caspi et al., 2013). Externalizing liability such as substance abuse was not explored. Third, differences in mental distress and internalized homophobia were observed among the sexual strategies theory, minority stress, and no intervention control groups in the pretest, indicating the sample in the different groups already had a difference before the intervention.

Acknowledgments

We would like to show our gratitude to Gu Li, assistant professor, Shanghai New York University who provided insight and expertise that greatly assisted the research and provided comments that significantly improved the manuscript.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.



Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

Human and Animal Welfare Statement

The presented study got the Institutional Review Board provided approval from Shanghai New York University, 2021-002-NYUSH-Pudong. Informed consent was obtained from the participants online.

ORCID iDs

Qianhui Gao  <https://orcid.org/0000-0002-6088-494X>
Jan Antfolk  <https://orcid.org/0000-0003-0334-4987>

Supplemental Material

Supplemental material for this article is available online.

References

- Buss, D. (2016). *Evolutionary psychology*. Routledge.
- Caspi, A., Houts, R. M., Belsky, D. W., Goldman-Mellor, S. J., Harrington, H., Israel, S., Meier, M. H., Ramrakha, S., Shalev, I., Poulton, R., & Moffitt, T. E. (2013). The p factor. *Clinical Psychological Science*, 2(2), 119–137. <https://doi.org/10.1177/2167702613497473>
- Emler, C. A., Fredriksen-Goldsen, K. I., Kim, H. J., & Hoy-Ellis, C. (2015). The relationship between sexual minority stigma and sexual health risk behaviors among HIV-positive older gay and bisexual men. *Journal of Applied Gerontology*, 36(8), 931–952. <https://doi.org/10.1177/0733464815591210>
- Feasel, S. H., Dover, T. L., Small, P. A., & Major, B. (2022). Effects of discrimination versus self-blame attributions on health: A longitudinal study. *Stigma and Health*, 7(3), 289–299. <https://doi.org/10.1037/sah0000393>
- Frijda, N. (1986). *The emotions*. Cambridge University Press.
- Glick, S. N., Morris, M., Foxman, B., Aral, S. O., Manhart, L. E., Holmes, K. K., & Golden, M. R. (2012). A comparison of sexual behavior patterns among men who have sex with men and heterosexual men and women. *JAIDS Journal of Acquired Immune Deficiency Syndromes*, 60(1), 83–90. <https://doi.org/10.1097/QAI.0b013e318247925e>
- He, X., Li, C., Qian, J., Cui, H., & Wu, W. (2010). Reliability and validity of a generalized anxiety disorder scale in general hospital outpatient. *Shanghai Archives of Psychiatry*, 22(4), 200–203. <https://doi.org/10.3969/j.issn.1002-0829.2010.04.002>
- Heiden-Rootes, K., Wiegand, A., Thomas, D., Moore, R., & Ross, K. (2018). A national survey on depression, internalized homophobia, college religiosity, and climate of acceptance on college campuses for sexual minority adults. *Journal of Homosexuality*, 67(4), 435–451. <https://doi.org/10.1080/00918369.2018.1550329>
- Herek, G. M. (1988). Heterosexuals' attitudes toward lesbians and gay men: Correlates and gender differences. *Journal of Sex Research*, 25(4), 451–477. <http://dx.doi.org/10.1080/00224498809551476>
- Herek, G. M., Gillis, J. R., & Cogan, J. C. (2009). Internalized stigma among sexual minority adults: Insights from a social psychological perspective. *Journal of Counseling Psychology*, 56(1), 32–43. <https://doi.org/10.1037/a0014672>
- Jin, F., Prestage, G. P., Mao, L., Poynten, I. M., Templeton, D. J., Grulich, A. E., & Zablotska, I. (2015). "Any condomless anal intercourse" is no longer an accurate measure of HIV sexual risk behavior in gay and other men who have sex with men.

- Frontiers in Immunology*, 6(86), 1–7. <https://doi.org/10.3389/fimmu.2015.00086>
- Kalichman, S. C., & Cain, D. (2004). A prospective study of sensation seeking and alcohol use as predictors of sexual risk behaviors among men and women receiving sexually transmitted infection clinic services. *Psychology of Addictive Behaviors*, 18(4), 367–373. <https://doi.org/10.1037/0893-164X.18.4.367>
- Kashubeck-West, S., Szymanski, D., & Meyer, J. (2008). Internalized heterosexism: Clinical implications and training considerations. *The Counseling Psychologist*, 36(4), 615–630. <https://doi.org/10.1177/0011000007309634>
- Kashubeck-West, S., & Szymanski, D. M. (2008). Risky sexual behavior in gay and bisexual men. *The Counseling Psychologist*, 36(4), 595–614. <https://doi.org/10.1177/0011000007309633>
- Kraus, S., Voon, V., & Potenza, M. (2016). Should compulsive sexual behavior be considered an addiction? *Addiction*, 111(12), 2097–2106. <https://doi.org/10.1111/add.13297>
- Kroenke, K., Spitzer, R. L., & Williams, J. B. W. (2001). The PHQ-9. *Journal of General Internal Medicine*, 16(9), 606–613. <https://doi.org/10.1046/j.1525-1497.2001.016009606.x>
- Li, F., Wu, J., Mai, X., Ning, K., Chen, K., Chao, L., & Zheng, X. (2016). Internalized homophobia and depression in homosexuals: The role of self-concept clarity. *Chinese Journal of Clinical Psychology*, 24(3), 475–479. <https://doi.org/10.16128/j.cnki.1005-3611.2020.06.016>
- Meanley, S., Chandler, C., Jaiswal, J., Flores, D. D., Stevens, R., Connochie, D., & Bauermeister, J. A. (2020). Are sexual minority stressors associated with young men who have sex with men's (YMSM) level of engagement in PrEP? *Behavioral Medicine*, 47(3), 225–235. <https://doi.org/10.1080/08964289.2020.1731675>
- Meyer, I. (1995). Minority stress and mental health in gay men. *Journal of Health and Social Behavior*, 36(1), 38–56. <https://doi.org/10.2307/2137286>
- Meyer, I. (2003). Prejudice, social stress, and mental health in lesbian, gay, and bisexual populations: Conceptual issues and research evidence. *Psychology of Sexual Orientation and Gender Diversity*, 1(S), 3–26. <https://doi.org/10.1037/2329-0382.1.S.3>
- Mimiaga, M. J., Closson, E. F., Thomas, B., Mayer, K. H., Betancourt, T., Menon, S., & Safren, S. A. (2014). Garnering an in-depth understanding of men who have sex with men in Chennai, India: A qualitative analysis of sexual minority status and psychological distress. *Archives of Sexual Behavior*, 44(7), 2077–2086. <https://doi.org/10.1007/s10508-014-0369-0>
- Pachankis, J. E., Goldfried, M. R., & Ramrattan, M. E. (2008). Extension of the rejection sensitivity construct to the interpersonal functioning of gay men. *Journal of Consulting and Clinical Psychology*, 76(2), 306–317. <https://doi.org/10.1037/0022-006X.76.2.306>
- Parmenter, J., Crowell, K., & Galliher, R. (2019). Subjective importance of masculinity as a factor in understanding risky sexual attitudes and behaviors among sexual minority men. *Sex Roles*, 82(7-8), 463–472. <https://doi.org/10.1007/s11199-019-01067-3>
- Parrish, C., Winkler, R., Seal, D. W., Benotsch, E. G., Pinkerton, S. D., Redmann, J., Fegley, J., Seeley, S., Traylor, D. L., Green, M., & Cejka, A. (2019). “No strings attached”: A qualitative exploration of gay and bisexual men's motivations for and attitudes toward engaging in casual sex while on vacation. *Journal of Gay & Lesbian Social Services*, 31(4), 397–415. <https://doi.org/10.1080/10538720.2019.1615590>
- Pinsof, D., & Haselton, M. (2016). The political divide over same-sex marriage: Mating strategies in conflict? *Psychological Science*, 27(4), 435–442. <https://doi.org/10.1177/0956797615621719>
- Pinsof, D., & Haselton, M. (2017). The effect of the promiscuity stereotype on opposition to gay rights. *PLoS One*, 12(7), e0178534. <https://doi.org/10.1371/journal.pone.0178534>
- Reddick, G., Heiden-Rootes, K., & Brimhall, A. (2016). Therapists' assessments in treating “sex addiction” and their relationship to clients' gender, relationship status, and exclusivity status. *Journal of Marital and Family Therapy*, 43(3), 537–553. <https://doi.org/10.1111/jmft.12210>
- Ren, Z., Howe, C. Q., & Zhang, W. (2019). Maintaining “mianzi” and “lizi”: Understanding the reasons for formality marriages between gay men and lesbians in China. *Transcultural Psychiatry*, 56(1), 213–232. <https://doi.org/10.1177/1363461518799517>
- Smith, C. A., & Lazarus, R. S. (1993). Appraisal components, core relational themes, and the emotions. *Cognition & Emotion*, 7(3-4), 233–269. <https://doi.org/10.1080/02699939308409189>
- Spitzer, R. L., Kroenke, K., Williams, J. B. W., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder. *Archives of Internal Medicine*, 166(10), 1092. <https://doi.org/10.1001/archinte.166.10.1092>
- Symons, D. (1979). *The evolution of human sexuality*. Oxford University Press.
- Tan, R. (2018). Internalized homophobia, HIV knowledge, and HIV/AIDS personal responsibility beliefs: Correlates of HIV/AIDS discrimination among MSM in the context of institutionalized stigma. *Journal of Homosexuality*, 66(8), 1082–1103. <https://doi.org/10.1080/00918369.2018.1491249>
- Terluin, B., van Marwijk, H. W., Adèr, H. J., de Vet, H. C., Penninx, B. W., Hermens, M. L., van Boeijen, C. A., van Balkom, A. J., van der Klink, J. J., & Stalman, W. A. (2006). The Four-Dimensional Symptom Questionnaire (4DSQ): A validation study of a multidimensional self-report questionnaire to assess distress, depression, anxiety and somatization. *BMC Psychiatry*, 6(34), 1–20. <https://doi.org/10.1186/1471-244X-6-34>
- Totenhagen, C., Randall, A., & Lloyd, K. (2018). Stress and relationship functioning in same-sex couples: The vulnerabilities of internalized homophobia and outness. *Family Relations*, 67(3), 399–413. <https://doi.org/10.1111/fare.12311>
- Trivers, R. L. (1972). Parental investment and sexual selection. In B. Campbell (Ed.), *Sexual selection and the descent of man: 1871–1971* (pp. 136–179). Aldine.
- Wellman, J. D., Beam, A. J., Wilkins, C. L., Newell, E. E., & Mendez, C. A. (2021). Masculinity threat increases bias and negative emotions toward feminine gay men. *Psychology of Men & Masculinities*, 22(4), 787–799. <https://doi.org/10.1037/men0000349>
- Wellman, J. D., & McCoy, S. K. (2014). Walking the straight and narrow: Examining the role of traditional gender norms in sexual prejudice. *Psychology of Men & Masculinity*, 15(2), 181–190. <https://doi.org/10.1037/a0031943>
- Xu, W., Zheng, L., Xu, Y., & Zheng, Y. (2017). Internalized homophobia, mental health, sexual behaviors, and outness of gay/bisexual

- men from Southwest China. *International Journal for Equity in Health*, 16(1), 36. <https://doi.org/10.1186/s12939-017-0530-1>
- Yanos, P. T., Adams, S., Roe, D., & Lysaker, P. H. (2021). The impact of illness identity on recovery from severe mental illness: A test of the model. *Journal of Clinical Psychology*, 77(10), 2341–2352. <https://doi.org/10.1002/jclp.23155>
- Yeung, A., Fung, F., Yu, S. C., Vorono, S., Ly, M., Wu, S., & Fava, M. (2008). Validation of the Patient Health Questionnaire-9 for depression screening among Chinese Americans. *Comprehensive Psychiatry*, 49(2), 211–217. <https://doi.org/10.1016/j.comppsy.2006.06.002>
- Ying, Y., Antfolk, J., & Santtila, P. (2023). An agent-based model of sex and sexual orientation differences in short-term mating behaviors as a result of mating preferences. *The Journal of Sex Research*, 1–9. <https://doi.org/10.1080/00224499.2023.2183485>
- You, X., Ju, C., Wang, M., Zhang, B., & Liu, P. (2017). Age differences in the influence of induced negative emotion on decision-making: The role of emotion regulation. *The Journals Of Gerontology: Series B*, 74(5), 796–805. <https://doi.org/10.1093/geronb/gbx137>
- Zhang, Y. L., Liang, W., Chen, Z. M., Zhang, H. M., Zhang, J. H., Weng, X. Q., Yang, S. C., Zhang, L., Shen, L. J., & Zhang, Y. L. (2013). Validity and reliability of patient health questionnaire-9 and patient health questionnaire-2 to screen for depression among college students in China. *Asia-Pacific Psychiatry*, 5(4), 268–275. <http://dx.doi.org/10.1111/appy.12103>