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Internalised Homonegativity predicts HIV-Associated Risk Behavior in European Men who have Sex with Men: Some Public Health Implications of Homophobia for Gay Men

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Abstract

Objectives: Internalised Homonegativity (IH) is associated with poor mental health in gay, lesbian and bisexual people and is hypothesised to be associated with HIV risk behavior and HIV testing in men who have sex with men (MSM). We sought to determine the social and individual variables associated with IH and the associations between IH and HIV-related behaviours.
Design and setting: We examined IH and its predictors as part of a larger anonymous Internet-delivered, cross-sectional study on HIV and health in MSM in 38 European countries.
Participants: 181,495 MSM, IH data analysis subsample 144,177. All participants had to be male, over the age of consent for homosexual activity in their country of domicile, and have had at least one homosexual contact in the past 6 months.
Methodology: An anonymous Internet-based questionnaire was disseminated in 25 languages through MSM social media, websites and organizations in 2010 and responses saved to a UK-based server. Questions covered the domains of demographics, HIV risk behavior, testing and treatment, sexual behavior, discrimination, drug use, and sexual attitudes. IH was measured using a standardized cross-culturally appropriate scale. There was no incentive for participation.
Results: Cluster analysis indicated 3 clusters of European countries based on level of experienced discrimination. IH was predicted by country LGB legal climate, GINI coefficient, and size of place of settlement. Lower IH in turn was associated with degree the respondent was "out" as gay to others and older age. "Outness" was strongly associated with ever having an HIV test and age, education and number of gay friends, while IH (controlling for number of non-steady unprotected sex partners) was associated with perceived control over sexual risk taking and condom use for anal intercourse.
Conclusions: IH is associated with LGB legal climate, economic development indices, and urbanization. It is also associated with "outness" and with HIV risk and preventive behaviors including HIV testing, perceived control over sexual risk, and condom use. These data confirm that homonegative climate is associated with IH and higher levels of HIV-associated risk in MSM. Attention to LGB human rights is an appropriate HIV reduction intervention for MSM.

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Introduction

Disease has classically been associated with disadvantage, with lower socioeconomic and occupational status being associated with chronic disease (1). Infectious disease has also been disproportionately associated with disadvantage, along with access to health services (expressed by Hart's inverse care law that those who are most in need of health care have the lowest access to it (2)). These patterns of disadvantage extend to targets of discrimination, including women and racial and ethnic minorities (3). More recently, structural inequalities such as income distribution have been implicated in poor health outcomes and access (4).

Discrimination is largely based on obvious stigmatizing characteristics such as race or appearance (5) and little attention has been paid to less visible stigmatizing statuses, such as homosexuality and homosexual behavior. As Ross (6) found, there is no close link between *experienced* discriminatory acts and *expectation* of discrimination, because those homosexual men who anticipate the worst outcomes remain the most hidden, and thus less likely to *experience* discrimination. Poor mental health has been hypothesized (7) to result from Internalization of negative attitudes and assumptions about homosexual people, commonly described as "homophobia". Internalized Homonegativity (IH), internalization of negative attitudes and assumptions about homosexual people by homosexuals themselves, leads to feelings of guilt, inferiority and lack of self-worth. Meyer (7) summarizes the evidence and places IH into the conceptual framework of minority stress, in which prejudice, stigma, and discrimination create a hostile and stressful social environment that may cause mental health problems.

Recent data indicate that IH is directly associated with mental health outcomes (8), with avoidance of HIV testing and identification as bisexual or straight in men who have sex with men (MSM) (but not HIV risk behaviors when sexual identification and race/ethnicity were controlled for) (9), and indirectly through the mediators of discomfort with discussing HIV status and condom use (10). Ryan et al. (11) found that family rejection of gay and lesbian adolescents was associated with an 8.4 times higher likelihood of attempting suicide, 5.9 times higher likelihood of depression, 3.4 times higher levels of using illegal drugs, and a 3.4 times higher risk of engaging in unprotected intercourse compared with teens who reported no or low levels of family rejection. A recent review of US studies (12) concluded that IH has minimal effect on risk behavior, although that conclusion has been criticized for being based largely on US data and for assuming a linear relationship between the two (13). However, Rosset al. (14) have demonstrated that IH predicts sexual risk behavior in gay men in Uganda, where homosexuality is heavily stigmatized. The data suggest that IH may vary significantly from country to country as a function of levels of discrimination at legal and structural levels as well as individual experience: that is, ambient homophobia is a major determinant of IH. European data from over a decade ago indicate that general population homonegativity is negatively associated with religion and immigration, and positively associated with urbanization and

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economic development (15, 16). EMIS is a European study with a unique opportunity to research IH in a range of political and social settings.

The European MSM Internet Survey (EMIS) (17) in 38 European countries is the first pan-European survey of MSM, by European researchers, and provides an opportunity to examine IH and both its structural predictors and its associations with HIV risk behavior in a large sample. A short form of Ross and Rosser's IH scale has recently been developed with culturally stable items (18, 19) to make this possible. We report on an analysis of IH levels by country structural variables including legal discrimination and income inequality, and levels of experienced discrimination, and in turn its associations with HIV testing and sexual behavior.

Methods

The methods of the European MSM Internet Survey have been described in great detail elsewhere (Weatherburn et al., submitted). In brief, EMIS is a joint project of academic, governmental, and non-governmental partners from 35 countries in Europe (EU and neighbouring countries) to simultaneously run an online survey in 25 different languages during summer 2010. EMIS was designed to inform the planning of prevention interventions for MSM by identifying prevention needs commonly unmet across MSM (priority aims), as well as subgroups of MSM who have many prevention needs poorly met (priority target groups).

Promotion and recruitment

The Internet-based self-completion survey study was promoted online and offline through various media for gay, bisexual, and other men who have sex with men (MSM) under the slogan 'Be part of something huge!' More than 235 local, national, and international Lesbian Gay Bisexual Transgender (LGBT) websites, undertook online recruitment and many of these organisations also promoted the survey offline, via posters, recruitment cards and face-to-face interaction. By visiting a promotion website men were exposed to banner advertisements inviting them to participate in the study. PlanetRomeo, Manhunt, Qruiser, Qguys, and Gaydar sent individual messages to their users inviting them to complete the survey. By clicking on the banner or the study link, potential respondents were directed to a survey "landing page" and asked to choose one of 25 languages for completion. Once they had chosen a language the first page described the study, including its purpose, its voluntary and anonymous nature, and gave contact information on how to contact the researchers.

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Men were eligible to participate if they were: living in Europe, at or over the age of homosexual consent in the country they lived in, sexually attracted to men and/or having sex with men. They also needed to indicate that they understood the nature and purpose of the study and consented to take part.

The survey was physically located on servers owned and administered by the company Demographix.com, whose staff was responsible for testing it across different computer platforms/operating systems and with different web-browsers, and managing the technical aspects including back-ups and data delivery to the researchers. The data were protected with a 128-bit SSL encryption server, not accessible to the public. We neither collected the IP-address of participants' computers nor installed any cookies on it. The survey was available online between June 4 and August 31, 2010. EMIS could be completed in any of 25 languages, and the questions were identical in each language version. It took 21minutes to complete the survey on average. No study recompense was offered. All study procedures were approved by the Research Ethics Committee of the University of Portsmouth, UK (REC 08/09:21).

Data preparation and analysis

At the close of fieldwork there were 184,469 cases in the consolidated file. Partially completed surveys (moving away from the web page before pressing 'submit') were not captured. When downloaded 3 cases were lost due to data corruption and 2,427 cases were removed from the dataset because they gave no country of residence or a country of residence outside the study area. A further 544 cases were removed on the basis they were women or men with no homosexual desire or experience, gave no age, or were under 13 or over 89 years old. This left a total of 181,495 cases meeting the qualifying criteria. Data from 291 cases from European countries and states that did not reach 100 qualifying cases were removed as were 6,995 cases with more than one inconsistency, defined as answers to two questions which cannot both be valid. Inconsistent data could be submitted by moving backwards and forwards in the survey and changing previously given answers. It could also be submitted simply by supplying inconsistent answers across one or more questions. Given the length and complexity of the survey, we allowed respondents to have one inconsistency in their given answers; but we excluded all cases with more than one inconsistency, suggesting giving random answers which is to be expected in a low-threshold questionnaire like EMIS. This left an analytic sample of 174,209 MSM from 38 European countries (17).

Analysis

Analyses, unless otherwise indicated, were carried out using SPSS version 19. Legal climate was measured by scoring the presence of the 6 legislative measures of LGB status (legal discrimination) listed by Wikipedia (20) in with a high score of 6 for presence of all legislative protections (homosexual acts are legal, recognition of same-sex relationships, same sex marriage, same-sex adoption, gays serve in the military, LGB antidiscrimination laws).

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IH was scored according to the criteria described by Ross et al. and Smolenski et al. (18,19) as an additive scale of 7 items, ranging from 0 to 6 (Cronbach's $\alpha = 0.70$).

Education was measured using the 6 levels of the International Standardised Classification of Educational Degrees (ISCED) corresponding to the educational system of each country.

Outness – defined as the proportion of people one is out to as gay or bisexual (family, friends, work or study colleagues) – was measured on a 5-point Likert scale from "all or almost all" to "none".

Proportion of male friends who are also attracted to men was measured on a 6-point Likert scale from "almost all of them" to "almost none of them" and "I don't have any male friends".

Size of settlement was measured on a 5-point scale from a "a very big city or town (a million or more people)", to "a village /the countryside (less than 10,000 people)".

Having ever had an HIV test was a binary (yes/no). Perceived control over sexual risk-taking was measured on a 5-point Likert scale anchored by "strongly agree" "and strongly disagree" with the statement "The sex I have is always as safe as I want it to be".

Relative frequency of condom use with non-steady partners was measured as "In the last 12 months, how often were condoms used when you had anal intercourse with non-steady male partners?" (6-point Likert scale "all or almost all" to "none").

The number of non-steady AI partners was asked as "How many non-steady partners did you have anal intercourse with in the last 12 months? (number).

EMIS asked for the recency of a range of sexual practices with non-steady partners. Although this set was originally designed to reflect certain transmission routes for HIV and STIs, it can serve as a proxy for diversity of sexual practices, even if sexual practices with steady partners are not included. Sexual diversity was the sum of the 9 different types of sexual behaviors with non-steady partners reported in the past 6 months (mutual masturbation, oral insertive, oral receptive, anal insertive, anal receptive, rimming, being rimmed, and insertive and receptive "fist-fucking". These were recoded as binaries to reflect engaging in them or not in the past 6 months and summed to form a measure of the relative diversity of the respondents' sexual repertoires (Cronbach's $\alpha = 0.77$).

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The Gini coefficient of income inequality was extracted from the UN Human Development Report coefficient for all countries (2008) with the exceptions of Cyprus, Malta, Luxembourg and Serbia, which were derived from an identical calculation method using the CIA Gini score (2008).

Table 2 illustrates the response categories for participants with valid IH score.

Cluster analysis of the 38 countries was carried out using SPSS 18: a two-step procedure using Euclidian distances was employed, entering three variables: country legal discrimination scores, proportion reporting verbal abuse, and proportion reporting physical violence because someone knew or presumed they were attracted to men. Three country clusters emerged including 9, 17, and, respectively, 12 countries; with good fit (Silhouette coefficient of cohesion and separation = 0.65; Figure 1).

Bivariate analyses were carried out using χ^2 with Cramer's Φ as measure of effect size for ordinal data, and *t*-test (using Cohen's D as measure of effect size). Effect size statistic for univariable ANOVA for interval or ratio level data was η^2. Because of the large size of the sub-sample with valid IH scores (N=144,177), almost all analyses were highly statistically significant so *p* levels are not reported. Regression analyses were carried out by linear regression for interval- or ratio-level dependent variables using simultaneous entry in hierarchical blocks of individual demographic variables, individual behavioural variables, plus external source country level variables. Path coefficients in Figure 3 are reflected by β from the linear regression and path arrows indicate direction of actual or temporal relationship (e.g., IH cannot affect age so the relationship has to be in the opposite direction), or predicted relationship in the model.

Results.

Basic demographic data are presented in Table 1 from participants with valid IH data. Table 2 illustrates the bivariate associations with strong effect sizes predicting ever having had an HIV test, specifically being "out" and proportion of MSM friends, followed by education and size of settlement. Data from the 38 countries clustered into three groups using measures of legal climate supporting LGB rights, proportion experiencing verbal discrimination, and physical discrimination because of assumed homosexuality. The three clusters of countries (Figure 1) characterized a group of liberal Northwestern (dk, fi, no, se) Western (be, fr, ie, nl, uk) and West-Central (at, ch, de, lu), European countries, a group of *'moderate'* Southwestern (es, it, gr, pt) and East-Central (cz, si, sk, hu, pl) European countries; and a group of *'conservative'* Southeastern (ba, bg, cy, hr, mt, ro, rs, tr), Northeastern (ee, lt,

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lv), and Eastern European countries (by, md, ru, ua) countries characterized by the highest levels of discrimination. Using the measure of LGB legal climate (the strongest predictor), Gini coefficient, and size of location of residence all predicted IH (Table 3, Figures 2 and 3). IH, in turn was associated with outness and age. The HIV-associated behavior most closely associated with IH were (a) ever being tested for HIV (mediated by outness), and (b) a perception of having no control over sexual risk-taking. Sexual diversity had a smaller impact. HIV testing was predicted, following outness as the major component, by the proportion of gay friends, highest educational attainment, and age.

A second linear regression limited to the demographics, HIV testing, "outness" and perceived control over sexual risk-taking onto IH indicated that those most closely associated with IH were lack of control over sexual risk-taking, and not being tested for HIV.

Bivariate relationships between IH and country cluster, Gini coefficient septiles, LGB legal climate (Figure 2) show a relationship between these variables and IH. Sexual diversity illustrates (Figure 2) an increase in sexual diversity with decreasing IH and a more limited range of sexual activity with higher IH.

Analysis of variance of IH score by relative frequency of condom use with non-steady partners, with covariates the number of non-steady partners that they had unprotected anal intercourse with in the past year and perceived control over sexual risk-taking, demonstrated a small to moderate effect size (η^2=.03). An accelerating relationship between IH and relative frequency of condom use with non-steady male partners was apparent (Figure 2).

Discussion

While these data represent 144,177 MSM in 38 countries, their collection via Internet constitutes a non-random sample. Previous data comparing Internet sexual data collection with questionnaire data from a random sample (21, 22) indicate that general Internet samples tend to be somewhat younger, single, better educated and urban, although Internet samples of MSM may be more bisexually-identified, worse educated and rural compared with traditional gay venue questionnaire samples in Sweden. The EMIS data are likely to be biased toward those who are better educated and Internet-literate, and probably more identified and familiar with the gay subculture. This problem will be more substantial in Eastern European countries where household Internet access is less common and smaller proportions of the whole MSM population participated in EMIS. On the other hand, the Law of Large Numbers would suggest that for the larger country samples, range is adequately represented. The three clusters which emerged of countries based on anti-gay discrimination are consistent with clusters of countries reported by Lottes and Akula (23) on self-expressed sexual values, including justification of homosexuality, in a pan-European sample.

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These data demonstrate the possible paths connecting anti-gay discrimination at legal and demographic levels with IH, along with size of place of residence. The relationship is clear despite relatively low variance in the tripartite classification of country by legal and experienced discrimination level. IH in turn is closely associated with younger age, social measures of being "out" and connected with gay peers, which in turn are associated with HIV test-taking (Figure 3). Higher IH is also associated with decreased levels of ever HIV test-taking as mediated by "outness" but not directly, and denying that their sexual conduct is always as safe as the respondents want it to be. Thus, higher IH appears to both discourage HIV testing (which may be considered a marker of acknowledgement of stigmatized status) and also to reduce the ability to have safe sex despite the intention to do so. Diversity of sexual behavior (Figure 2) appears to be restricted by IH, with lower sexual repertoire, possibly because of interactions limited by time, locale or anonymity.

Condom use for anal intercourse, controlling for number of non-steady sexual partners for anal sex, and the perceived control over sexual risk-taking, revealed a relationship of lower IH with increasing condom use. This suggests that IH is associated with risky sexual behavior generally and condom use specifically (Figure 4).

These data indicate relationships between level of legal and experienced discrimination and IH, and in turn between IH and both outness and gay peer contact, and HIV risk behaviors. HIV risk behaviors associated with high IH include lower levels of HIV testing, lower levels of volitional safe sex, and with lower levels of condom use for anal sex when safe sex volition and partner number are controlled for. The relationship of the Gini coefficient and IH is interesting and here the Gini coefficient probably represents a level of attitude to equality beyond the purely economic (Figure 2) and is consistent with the association found between sexuality-related attitudes and human development indices (15,16,23) in previous pan-European research.

These findings on IH are consistent with previous data of Shoptaw et al. (9) on IH, albeit using a different IH measure, in African American MSM in Los Angeles, including their finding that IH is associated with lower HIV testing and education levels. It is also consistent with the pathways that Ross et al. (10) described in HIV seropositive US MSM where IH is associated with risk behavior through less openness, and discomfort with discussion of sexuality, HIV status and condom use. The finding that there is a higher level of risk behavior (non-use of condoms with casual partners) is also consistent with the data of Ryan (11) in relation to the impact of family homonegativity in adolescents and Sandfort on the impact of school psychological environment on mental health of Dutch LGB adolescents (24).

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These data suggest, however, that IH may have pervasive effects on sexual behavior related to HIV prevention through the association of a homonegative legal and social climate with higher levels of risk and lower levels of preventive behaviors, at both personal and probably policy levels, although more research is required to elucidate these. Hatzenbuehler et al. (254) note that state-level protective policies modify the effect of sexual orientation on mental health disorders, and it is logical that one of the mechanisms for this may be through reduction of institutional discrimination, hate crimes, homonegativity and interventions to reduce internalized homonegativity. No study in Europe has previously looked at HIV-preventive behavior and homonegativity.

From these pan-European data, homonegative stigma can be clearly linked through IH to increased HIV risk in MSM at both population and personal levels. Discrimination is bad law, bad policy, bad psychology and bad medicine: reducing homonegative policy and interactions at legal and social levels will have positive health as well as human rights impacts on MSM populations.

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Contributorship Statement

- Prof. Ross carried out most of the data analyses and wrote initial drafts. Drs Berg and Schmidt carried out some data analyses and revised and added to the drafts. Prof Hospers and Dr Weatherburn wrote and revised sections of the drafts. Drs Breviglieri and Furegato revised and commented on subsequent drafts. All authors except Prof. Ross were principals of the EMIS study and conceptualised and carried out the study.

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Competing Interest

- there are no competing interests

Data Sharing Statement

- Data will be placed in the public domain two years after the conclusion of the study.

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Table 1: Demographic characteristics of MSM with Internalized Homonegativity scores

Top level domain	Country	*n* with IH score[1]	Median age	% Live in City > 500,000	% Tertiary education	% Employed[2]	% now in relationship with a man	IH Mean[3]
at	Austria	3046	30	47.6	31.6	71.7	40.3	1.48
ba	Bosnia & Herzegovina	103	28	15.3	53.9	57.8	22.5	2.61
be	Belgium	3075	33	44.3	67.4	72.0	46.0	1.52
bg	Bulgaria	767	27	66.3	59.9	67.9	35.6	2.61
by	Belarus	296	27	63.5	68.9	79.7	53.4	2.29
ch	Switzerland	3819	36	13.3	47.8	80.0	43.4	1.53
cy	Cyprus	209	30	3.0	64.4	74.2	28.7	2.36
cz	Czech Republic	1809	27	46.6	42.9	65.3	50.1	1.67
de	Germany	39799	33	42.0	33.3	73.3	42.7	1.47
dk	Denmark	1254	33	52.5	50.4	67.6	35.6	1.46
ee	Estonia	469	30	9.2	48.4	72.7	40.0	1.81
es	Spain	9690	31	51.2	59.5	65.4	31.6	1.60
fi	Finland	1642	33	39.0	51.2	68.9	43.7	1.61
fr	France	8837	34	52.4	74.7	68.6	47.5	1.59
gr	.Greece	2214	30	70.5	65.9	69.3	35.4	2.10
hr	Croatia	410	29	54.3	64.5	62.9	36.8	2.17
hu	Hungary	1502	28	67.1	69.3	70.2	44.7	1.77
ie	Ireland (Republic)	1701	31	50.1	70.9	70.3	29.0	1.79
it	Italy	11905	33	35.6	43.9	68.8	37.2	1.87
lt	Lithuania	423	27	47.7	73.8	72.1	47.5	2.11
lu	Luxembourg	209	34	3.4	54.3	75.4	40.4	1.57
lv	Latvia	540	30	62.4	49.7	79.6	46.1	2.14
md	Moldova	87	24	62.8	59.8	64.4	49.4	2.53
mk	Macedonia	86	28	62.8	82.6	69.8	27.9	2.35
mt	Malta	95	33	1.1	61.1	85.3	39.4	2.02
nl	Netherlands	2903	39	42.2	62.4	76.9	45.4	1.40

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no	Norway	1555	30	42.2	64.7	68.1	33.9	1.49
pl	Poland	1631	28	64.3	75.5	67.1	45.8	2.07
pt	Portugal	3858	30	43.5	60.1	69.5	39.0	1.90
ro	Romania	1593	27	46.7	58.3	67.4	38.5	2.29
rs	Serbia	822	28	54.6	56.6	54.9	33.6	2.30
ru	Russia	4041	30	79.2	73.5	83.7	52.7	2.09
se	Sweden	2215	35	54.8	55.6	73.5	40.5	1.41
si	Slovenia	673	30	1.8	47.5	64.3	39.5	2.08
sk	Slovakia	422	26	26.7	49.6	62.5	44.1	1.77
tr	Turkey	1312	28	87.7	85.0	65.3	34.5	2.48
ua	Ukraine	1332	29	70.7	76.0	83.2	50.9	2.20
uk	United Kingdom	13851	36	51.0	64.7	75.2	36.0	1.58

[1]83.2% overall have IH scores [2]Excludes students and unemployed

[3] 0-6 scale

Table 2: Univariable analysis: predictors of ever testing for HIV

Variable	Untested %	Ever tested for HIV %	Statistic* Cramer's Φ
Being "out" to family/friends/colleagues (=Outness)			
All or almost all	16.2	83.8	
More than half	24.1	75.9	
Less than half	29.7	70.3	
Few	39.4	60.6	
None	57.3	42.7	0.28
Proportion of male friends attracted to men			
Almost all	14.8	85.2	
More than half	16.3	83.7	
Approximately half	20.2	79.8	
Less than half	28.5	71.5	
Almost none of them	44.6	55.4	

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Have no male friends	45.6	54.4	0.26
Education (6 levels of ISCED**)			
No secondary qualification	38.5	61.5	
Some high school/trade qualification	34.2	65.8	
Lower secondary education	30.1	69.9	
Upper secondary education	33.2	66.8	
Higher education below degree level	24.4	75.6	
University degree completed	19.1	80.9	0.13
Size of settlement			
Very big city or town (1 million or more)	19.4	80.6	
Big city or town (½ to 1 million)	23.1	76.9	
Medium city (100,000 to ½ million)	28.5	71.5	
Small city (10,000 to 100,000)	35.0	65.0	
Village or rural area (<10,000)	36.7	63.3	0.15
	mean±SD		Cohen's *d*
Internalized Homonegativity	1.85±1.31	1.37±1.18	0.40
Age	30.43±11.56	35.56±10.60	0.47

*Given sample size of 144,177 significance is not shown (144,177 cases with IH score are 82.8% of eligible cases with consistent data).

** The 6 levels of the International Standardised Classification of Educational Degrees.

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Table 3: Regression analysis of Internalized Homonegativity and HIV-related risk behaviors

	β*	B
Analysis 1		
Step 1: Structural variables predicting Internalized Homonegativity		
LGB legal climate (country level)	-.14	-.16
Gini Coefficient (country level)	.09	.03
Size of settlement (individual level)	.08	.07
Step 2: Individual demographic and variables predicting Internalized Homonegativity		
Outness	-.51	-.30
Perceived control over sexual risk-taking (Y/N)	-.09	-.11
Ever had an HIV test (Y/N)	-.01	-.02
Age (per year)	-.08	-.01
Sexual diversity	-.05	-.03
Step 3: IH, social and demographic variables predicting having HIV test		
Internalized Homonegativity (per 1)	-.01	-.01
Outness	-.21	-.07
Proportion of gay friends	-.14	-.04
Education	.10	.04
Age (per year)	.17	.01
Analysis 2		
Internalized Homonegativity as predictor of sexual variables		
Perceived control over sexual risk-taking (Y/N)	-.15	-.18
Sexual diversity	-.01	-.01
Ever had an HIV test (Y/N)	-.13	-.40

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Relative frequency, condom use, non-steady partners past year	.03	.03

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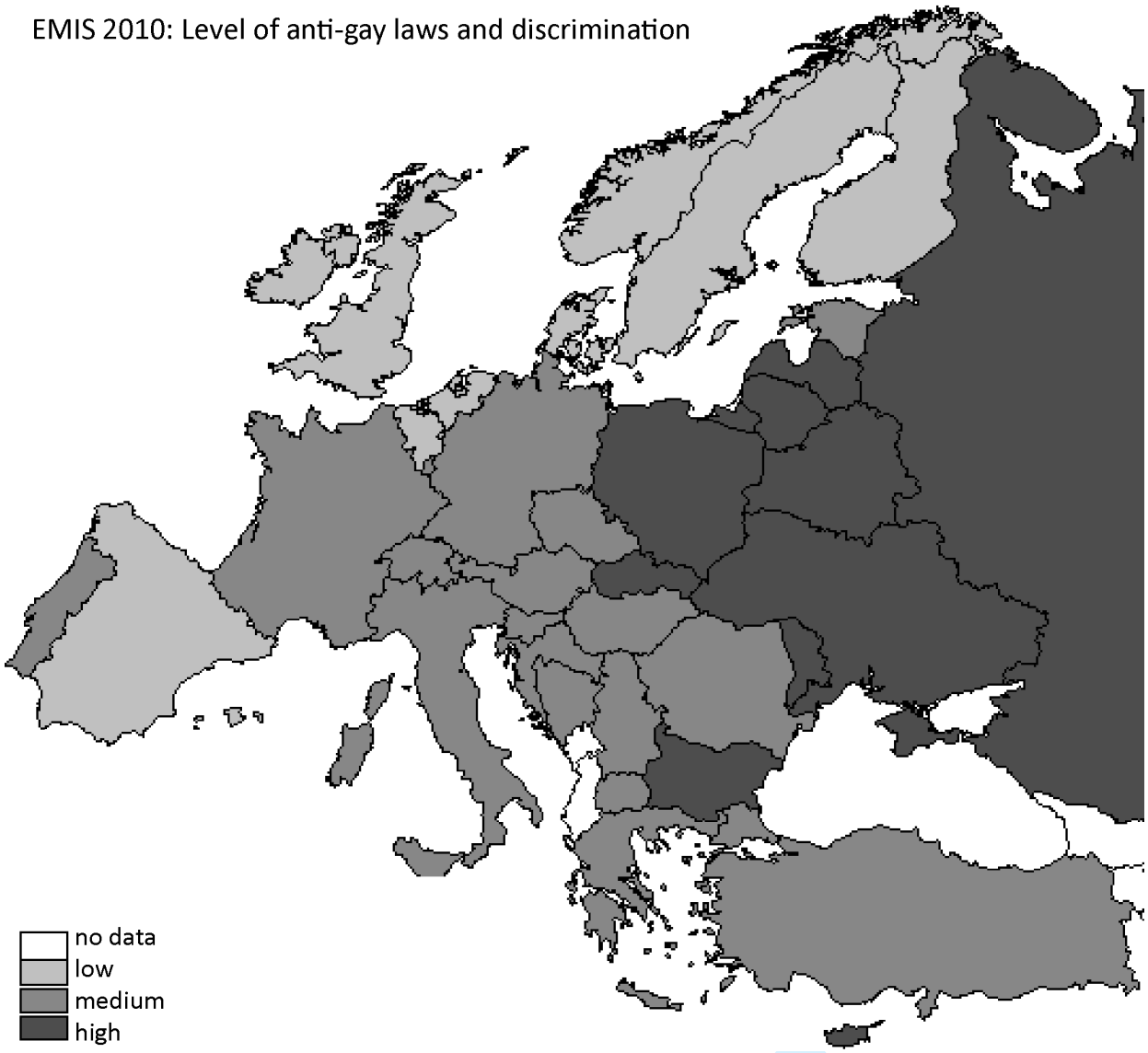

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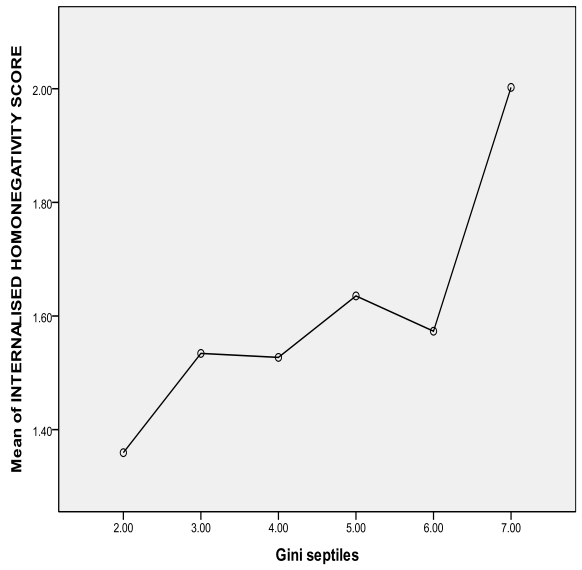
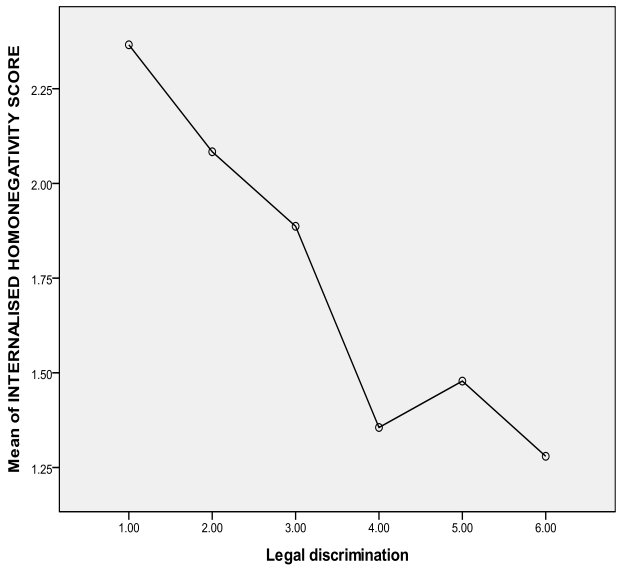
Figure 2: Relationship of Internalized Homonegativity to Social and Behavioral Variables

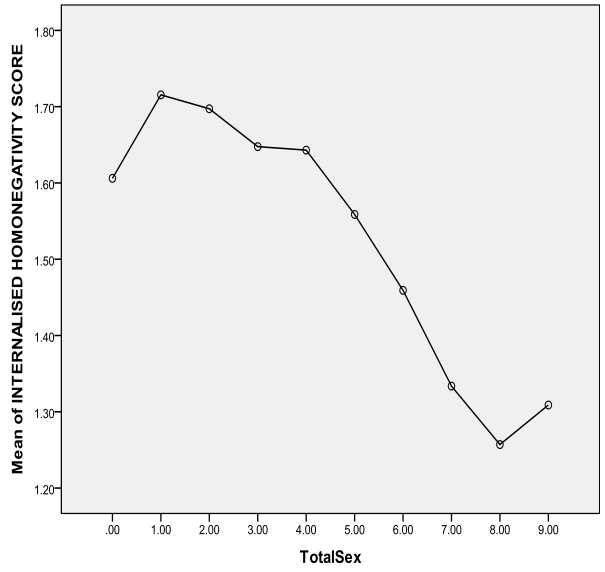
Relationship of Internalized Homonegativity to Gini Coefficient septiles



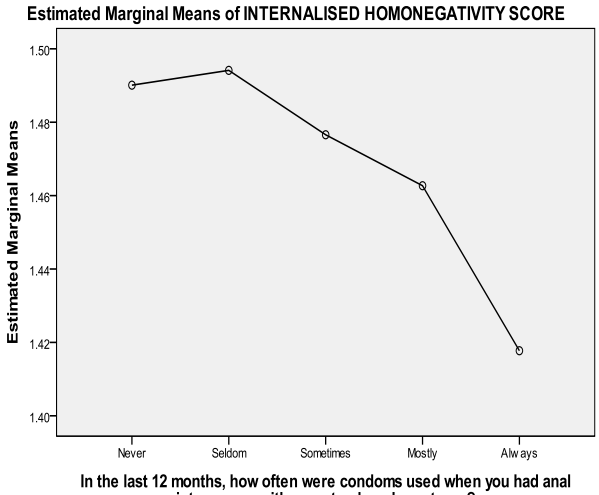
Relationship of Internalized Homonegativity to Gay Legal Discrimination Index



Relationship of Internalized Homonegativity to Sexual diversity Score



Internalized Homonegativity score by Condom use for Anal intercourse with Non-steady Partners in past 6 months



Covariates appearing in the model are evaluated at the following values: The sex I have is always as safe as I want it to be. = 4.16, How many non-steady male partners have you had anal intercourse without a condom with in the last 12 months? = 2.68

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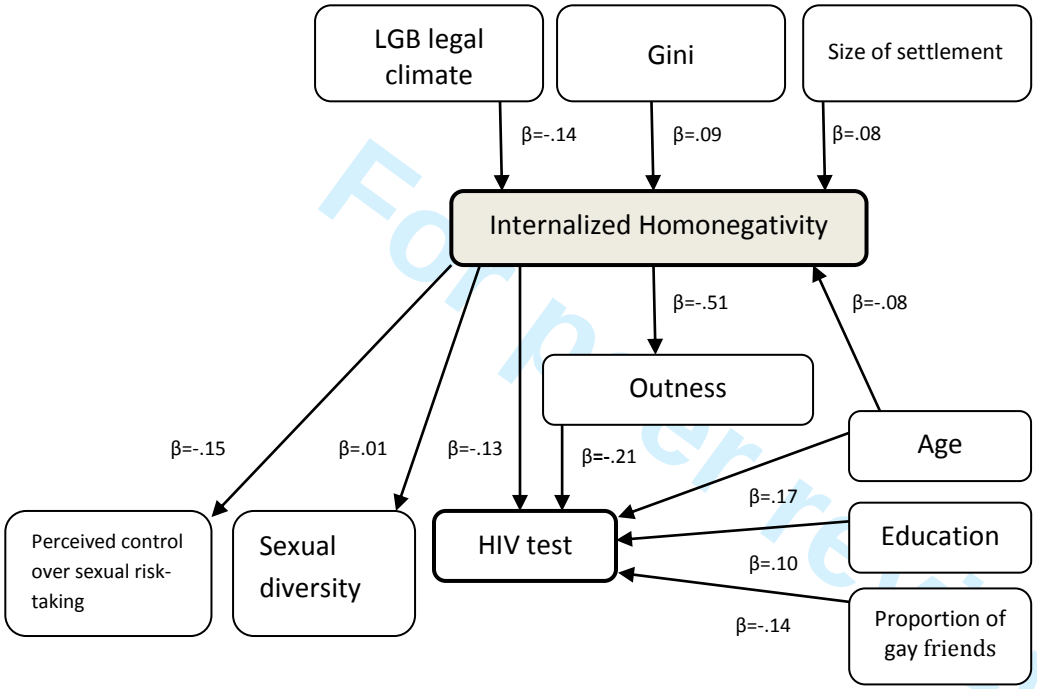
Figure 3: Paths Associated with Internalized Homonegativity



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Internalised Homonegativity predicts HIV-Associated Risk Behavior in European Men who have Sex with Men in a 38-country cross-sectional study: Some Public Health Implications of Homophobia

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(Draft 11, November 2 2012)

Internalised Homonegativity predicts HIV-Associated Risk Behavior in European Men who have Sex with Men in a 38-Country Cross-sectional Study: Some Public Health Implications of Homophobia

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Abstract

Objectives: Internalised Homonegativity (IH) is hypothesised to be associated with HIV risk behavior and HIV testing in men who have sex with men (MSM). We sought to determine the social and individual variables associated with IH and the associations between IH and HIV-related behaviours.
Design and setting: We examined IH and its predictors as part of a larger Internet-delivered, cross-sectional study on HIV and health in MSM in 38 European countries.
Participants: 181,495 MSM, IH data analysis subsample 144,177. All participants were male, over the age of consent for homosexual activity in their country of domicile, and have had at least one homosexual contact in the past 6 months.
Methodology: An anonymous Internet-based questionnaire was disseminated in 25 languages through MSM social media, websites and organizations and responses saved to a UK-based server. IH was measured using a standardized cross-culturally appropriate scale.
Results: Three clusters of European countries based on level of experienced discrimination emerged. IH was predicted by country LGB legal climate, Gini coefficient, and size of place of settlement. Lower IH was associated with degree the respondent was "out" as gay to others, and older age. "Outness" was associated with ever having an HIV test and age, education and number of gay friends, while IH (controlling for number of non-steady unprotected sex partners and perceived lack of control over safe sex) was associated with condom use for anal intercourse.

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Conclusions: IH is associated with LGB legal climate, economic development indices, and urbanization. It is also associated with "outness" and with HIV risk and preventive behaviors including HIV testing, perceived control over sexual risk, and condom use. Homonegative climate is associated with IH and higher levels of HIV-associated risk in MSM. Reducing IH through attention to LGB human rights may be appropriate HIV reduction intervention for MSM.

Article Focus:

- Internalized Homonegativity (IH) has been implicated as a variable associated with HIV risk behaviours.
- We examined the paths associated with IH in a study of over 140,000 MSM in 38 European countries
- We established several social structural variables acting through IH to influence HIV testing and condom use

Key Messages:

- Gay legal discrimination, size of place of residence and Gini coefficient of economic inequality were macro or country-level variables that influenced IH
- IH in turn influenced being "out" and through that HIV testing
- Perceived control over safe sex and condom use were predicted by IH and the country-level variables

Strengths and Weaknesses:

- The study had a large *n* and with 38 countries, we were able to demonstrate that countries clustered onto a single discrimination continuum
- We demonstrate linkages between macro-level (country), meso level (community) and micro (individual level) variables including HIV-associated risk behaviour
- Effect sizes were sometimes small and of theoretical rather than practical importance

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Introduction

Disease has classically been associated with disadvantage, with lower socioeconomic and occupational status being associated with chronic disease (1). Infectious disease has also been disproportionately associated with disadvantage, along with access to health services (expressed by Hart's inverse care law that those who are most in need of health care have the lowest access to it (2)). These patterns of disadvantage extend to targets of discrimination, including women and racial and ethnic minorities (3). More recently, structural inequalities such as income distribution have been implicated in poor health outcomes and access (4).

Discrimination is largely based on obvious stigmatizing characteristics such as race or appearance (5) and little attention has been paid to less visible or invisible stigmatizing statuses, such as homosexuality and homosexual behavior. As Ross (6) found, there is no close link between *experienced* discriminatory acts and *expectation* of discrimination, because those homosexual men who anticipate the worst outcomes remain the most hidden, and thus less likely to *experience* discrimination. Poor mental health has been hypothesized (7) to result from internalization of negative attitudes and assumptions about homosexual people, commonly described as "homophobia". Internalized Homonegativity (IH), internalization of negative attitudes and assumptions about homosexual people by homosexuals themselves, leads to feelings of guilt, inferiority and lack of self-worth. Meyer (7) summarizes the evidence and places IH into the conceptual framework of minority stress, in which prejudice, stigma, and discrimination create a hostile and stressful social environment that may cause mental health problems.

Recent data indicate that IH is directly associated with mental health outcomes (8), with avoidance of HIV testing and identification as bisexual or straight in men who have sex with men (MSM) (but not HIV risk behaviors when sexual identification and race/ethnicity were controlled for) (9), and indirectly through the mediators of discomfort with discussing HIV status and condom use (10). Ryan et al. (11) found that family rejection of gay and lesbian adolescents was associated with an 8.4 times higher likelihood of attempting suicide, 5.9 times higher likelihood of depression, 3.4 times higher levels of using illegal drugs, and a 3.4 times higher risk of engaging in unprotected intercourse compared with teens who reported no or low levels of family rejection. A recent review of US studies (12) concluded that IH has minimal effect on risk behavior, although that conclusion has been criticized for being based largely on US data and for assuming a linear relationship between the two variables (13). However, Ross et al. (14) have demonstrated that IH predicts sexual risk behavior in gay men in Uganda, where homosexuality is heavily stigmatized. The data suggest that IH may vary significantly from country to country as a function of levels of discrimination at legal and structural levels as well as individual experience: that is, ambient homophobia is a major determinant of IH. European data from over a decade ago indicate that general population homonegativity is negatively associated with religion and immigration, and positively associated with urbanization and

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economic development (15, 16). EMIS is a European study with a unique opportunity to research IH in a range of political and social settings.

The European MSM Internet Survey (EMIS) (17) in 38 European countries is the first pan-European survey of MSM, by European researchers, and provides an opportunity to examine IH and both its structural predictors and its associations with HIV risk behavior in a large and geographically diverse sample, with sufficient countries to enable analysis by country-level (macro) as well as local (meso) and individual (micro) level variables. A short form of Ross and Rosser's IH scale has recently been developed with culturally stable items (18, 19) to make this possible. We report on an analysis of IH levels by country structural variables including legal discrimination and income inequality, and levels of experienced discrimination, and in turn its associations with HIV testing and preventive sexual behavior. We hypothesize that IH will be influenced by legal climate regarding LGB (Lesbian, Gay and Bisexual) variables and possibly other structural issues, and that IH will itself be associated with MSM's visibility and social context, and HIV-related prevention behaviors including HIV testing and condom use.

Methods

The methods of the European MSM Internet Survey have been described in detail elsewhere (Weatherburn et al., submitted). In brief, EMIS is a joint project of academic, governmental, and non-governmental partners from 38 countries in Europe (EU and neighbouring countries) to simultaneously run an online survey in 25 different languages during summer 2010. EMIS was designed to inform the planning of prevention interventions for MSM by identifying prevention needs commonly unmet across MSM (priority aims), as well as subgroups of MSM who have many prevention needs poorly met (priority target groups).

Promotion and recruitment

The Internet-based self-completion survey study was promoted online and offline through various media for gay, bisexual, and other men who have sex with men (MSM) under the slogan 'Be part of something huge!' More than 235 local, national, and international Lesbian Gay Bisexual Transgender (LGBT) websites, undertook online recruitment and many of these organizations also promoted the survey offline, via posters, recruitment cards and face-to-face interaction. By visiting a promotion website men were exposed to banner advertisements inviting them to participate in the study. PlanetRomeo, Manhunt, Qruiser, Qguys, and Gaydar sent individual messages to their users inviting them to complete the survey. By clicking on the banner or the study link, potential respondents were directed to a survey "landing page" and asked to choose one of 25 languages for completion. Once they had chosen a language the first page described the study, including its purpose, its voluntary and anonymous nature, and gave contact information on how to contact the researchers.

Men were eligible to participate if they were: living in Europe, at or over the age of homosexual consent in the country they lived in, sexually attracted to men and/or having sex with men. They

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also needed to indicate that they understood the nature and purpose of the study and consent to take part.

The survey was physically located on servers owned and administered by the company Demographix.com, whose staff was responsible for testing it across different computer platforms/operating systems and with different web-browsers, and managing the technical aspects including back-ups and data delivery to the researchers. The data were protected with a 128-bit SSL encryption server, not accessible to the public. We neither collected the IP-address of participants' computers nor installed any cookies on it. The survey was available online between June 4 and August 31, 2010. EMIS could be completed in any of 25 languages, and the questions were identical in each language version. It took 21minutes to complete the survey on average. No study recompense was offered. All study procedures were approved by the Research Ethics Committee of the University of Portsmouth, UK (REC 08/09:21).

Data preparation and analysis

At the close of fieldwork there were 184,469 cases in the consolidated file. Partially completed surveys (moving away from the web page before pressing 'submit') were not captured. When downloaded 3 cases were lost due to data corruption and 2,427 cases were removed from the dataset because they gave no country of residence or a country of residence outside the study area. A further 544 cases were removed on the basis they were women, or men with no homosexual desire or experience, gave no age, or were under 13 or over 89 years old. This left a total of 181,495 cases meeting the qualifying criteria. Data from 291 cases from European countries and states that did not reach 100 qualifying cases were removed as were 6,995 cases with more than one inconsistency, defined as answers to two questions which cannot both be valid. Inconsistent data could be submitted by moving backwards and forwards in the survey and changing previously given answers. It could also be submitted simply by supplying inconsistent answers across one or more questions. Given the length and complexity of the survey, we allowed respondents to have one inconsistency in their given answers; but we excluded all cases with more than one inconsistency, suggesting giving random answers which is to be expected in a low-threshold questionnaire like EMIS. This left an analytic sample of 174,209 MSM from 38 European countries (17).

Measures and Analyses

Measures

IH was scored according to the criteria described by Ross et al. and Smolenski et al. (18,19) as an additive scale of 7 items, ranging from 0 to 6 (Cronbach's $\alpha = 0.70$).

Education was measured using the 6 levels of the International Standardized Classification of Educational Degrees (ISCED) corresponding to the educational system of each country.

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"Outness" – defined as the proportion of people one is out to as gay or bisexual (family, friends, work or study colleagues) – was measured on a 5-point Likert scale from "all or almost all" to "none".

Proportion of male friends who are also attracted to men was measured on a 6-point Likert scale from "almost all of them" to "almost none of them" and "I don't have any male friends".

Having ever had an HIV test was a binary (yes/no). We compared this binary variable with the extended variable of how long ago the respondent had had an HIV test (24 hours, 7 days, 1 month, 6 months, 12 months, 5 years, more than 5 years ago) and found that the two measures correlated 0.88. We thus decided to use the binary measure in analyses, particularly given the non-linear nature of the time measure.

Perceived control over sexual risk-taking was measured on a 5-point Likert scale anchored by "strongly agree" "and strongly disagree" with the statement "The sex I have is always as safe as I want it to be".

Relative frequency of condom use with non-steady partners was measured as "In the last 12 months, how often were condoms used when you had anal intercourse with non-steady male partners?" (6-point Likert scale "all or almost all" to "none").

The number of non-steady anal intercourse (AI) partners was asked as "How many non-steady partners did you have anal intercourse with in the last 12 months? (number).

Sexual diversity of practice: EMIS asked for the recency of a range of sexual practices with non-steady partners. Although this set was originally designed to reflect certain transmission routes for HIV and STIs, it can serve as a proxy for diversity of sexual practices, even if sexual practices with steady partners are not included. Sexual diversity was the sum of the 9 different types of sexual behaviors with non-steady partners reported in the past 6 months (mutual masturbation, oral insertive, oral receptive, anal insertive, anal receptive, rimming, being rimmed, and insertive and receptive "fist-fucking". These were recoded as binaries to reflect engaging in them or not in the past 6 months and summed to form a measure of the relative diversity of the respondents' sexual repertoires (Cronbach's $\alpha = 0.77$).

Size of settlement was measured on a 5-point scale from a "a very big city or town (a million or more people)", to "a village /the countryside (less than 10,000 people)".

Legal climate was measured by scoring the presence of the 6 legislative measures of LGB status (legal discrimination) listed by Wikipedia (20) in with a high score of 6 for presence of all legislative protections (homosexual acts are legal, recognition of same-sex relationships, same sex marriage, same-sex adoption, gays serve in the military, LGB antidiscrimination laws).

The Gini coefficient of income inequality in a country was extracted from the UN Human Development Report coefficient for all countries (2008) with the exceptions of Cyprus, Malta, Luxembourg and Serbia, which were derived from an identical calculation method using the CIA Gini score (2008). The Gini coefficient ranges from 0 (all people in a country have equal income) to 1.0 (one person has all the income). It serves as a general economic measure of distribution of wealth.

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Analyses Analyses, unless otherwise indicated, were carried out using SPSS versions 19 and 20, on the 38 country dataset (Table 1). Cluster analysis of the 38 countries was carried out using SPSS 19: a two-step procedure using Euclidian distances was employed, entering three variables: country LGB legal discrimination scores, proportion of MSM reporting verbal abuse, and proportion of MSM reporting physical violence because someone knew or presumed they were attracted to men. Three country clusters emerged including 9, 17, and, respectively, 12 countries, with good fit (Silhouette coefficient of cohesion and separation = 0.65; Figure 1).

Bivariate analyses were carried out using χ^2 with Cramer's Φ as measure of effect size for ordinal data, and *t*-test (using Cohen's D as measure of effect size)(Table 2). Effect size statistic for univariable ANOVA for interval or ratio level data was η^2. Because of the large size of the sub-sample with valid IH scores (N=144,177), almost all analyses were highly statistically significant so *p* levels are not reported. Means of IH were graphed against selected structural and behavioral variables in Figure 1 to illustrate the relationship between variables. Regression analysis in Table 3 was carried out by linear regression for interval- or ratio-level dependent variables using simultaneous entry in hierarchical blocks of individual demographic variables, individual behavioral variables, plus external source country level variables. Path coefficients calculations appear in Table 3 and in Figure 3 are reflected by β from the linear regressions in Table 3, with path arrows indicate direction of temporal relationship (e.g., IH cannot affect age so the relationship has to be in the opposite direction), or predicted relationship in the model. Stepwise linear regression was carried out for variables predicting Perceived Control over Sexual Risk-Taking in Table 4 to allow variables to enter in a forward hierarchical model.

Results.

Basic demographic data are presented in Table 1 from participants with valid IH data. These data from 38 countries illustrate the *n*s for each country (ranging from 86 in Macedonia to over 39,000 in Germany), median age (ranging from 24 in Moldova to 36 in Switzerland and the UK), % living in a city >500,000 population (ranging from 3% in Malta to 87.7% in Turkey), % with tertiary education (ranging from 31.6% in Austria to 85.0% in Turkey), % employed (ranging from 54.9% in Romania to 85.3% in Malta), and % now in a relationship with another man (ranging from 22.5% in Bosnia-Herzegovina to 53.4% in Belarus to 53.4% in Belarus). IH scores ranged from 1.22 in The Netherlands and 1.23 in Sweden, to 2.57 in Bulgaria and 2.54 in Bosnia-Herzegovina.

Data from the 38 countries clustered into three groups using (a) measures of legal climate supporting LGB rights, (b) proportion experiencing verbal discrimination, and (c) physical violence because of assumed homosexuality. The three clusters of countries (Figure 1) characterized a group of "liberal" Scandinavian countries (Denmark, Finland, Norway, Sweden) Western (Belgium, , Ireland, The Netherlands, United Kingdom, Spain) European countries; a group of "moderate" Central and Mediterranean countries (France, Portugal, Germany, Czech

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Republic, Switzerland, Italy, Austria, Slovenia, Hungary, Croatia, Bosnia-Herzegovina, Romania, Macedonia, Greece, Turkey, Estonia); and a group of "conservative" Southeastern, Northeastern, and Eastern European countries (Poland, Slovakia, Belarus, Lithuania, Latvia, Russia, Ukraine, Moldova, Bulgaria, Cyprus), countries characterized by the highest levels of discrimination (note that IH was not part of the equation for this clustering process). Clustering countries on the basis of legal and self-reported personal discrimination against MSM provided both a potential validation of the measure of IH, and a means of conceptualizing geographic sub-sets of levels of discrimination (Figure 2). IH was closely related to the three discrimination-based clusters, with highest IH in the "conservative" countries and lowest IH in the "liberal" cluster of countries.

Using the measures of LGB legal climate (the strongest predictor), Gini coefficient, and size of place of residence all predicted IH (Table 3, Figures 2 and 3). IH, in turn was associated with outness and age. The HIV-associated behavior most closely associated with IH were (a) ever being tested for HIV (mediated by outness), and (b) a perception of having no control over sexual risk-taking. Sexual diversity had a smaller impact. HIV testing was predicted, following outness as the major component, by the proportion of gay friends, highest educational attainment, and age.

A second linear regression limited to the demographics, HIV testing, "outness" and perceived control over sexual risk-taking onto IH indicated that those most closely associated with IH were lack of control over sexual risk-taking, and not being tested for HIV.

Bivariate relationships between IH and country cluster, Gini coefficient septiles, LGB legal climate (Figure 2) show a relationship between these variables and IH. Sexual diversity illustrates (Figure 2) an increase in sexual diversity with decreasing IH and a more limited range of sexual activity with higher IH.

Table 2 illustrates the bivariate associations with strong effect sizes predicting ever having had an HIV test, specifically being "out" and proportion of MSM friends, followed by education and size of settlement.

Analysis of variance of IH score by relative frequency of condom use with non-steady partners, with covariates the number of non-steady partners that they had unprotected anal intercourse with in the past year and Perceived Control over Sexual Risk-Taking, demonstrated a small to moderate effect size (η^2=.03). An accelerating relationship between IH and relative frequency of condom use (covariates perceived control over sexual risk, and number of casual partners in the past year) with non-steady male partners was apparent (Figure 2). The strong relationship of Perceived Control over Sexual Risk-Taking in Figure 2 with condom use lead to an additional analysis of the predictors of this Perceived Control (Table 4). The highest stepwise predictors were number of non-steady partners one had anal intercourse with in the past 12 months; IH; GINI coefficient; and LGB legal climate.

Discussion

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While these data represent 144,177 MSM in 38 countries, their collection via Internet constitutes a non-random sample. Previous Swedish data comparing Internet sexual data collection with questionnaire data from a large national random sample from a sexuality study in the same country (21, 22) indicate that general Internet samples tend to be somewhat younger, more likely to be single, better educated and urban. Internet samples of MSM may be more bisexually-identified, worse educated and rural compared with traditional *gay venue questionnaire-based* samples in Sweden. The Swedish data indicate the known biases for Internet samples by comparing them with a national "gold standard" study. The EMIS data, are likely to be biased toward those who are better educated and Internet-literate, and probably more familiar with the gay subculture. This sampling biaswill be more substantial in Eastern European countries where household Internet access is less common and smaller proportions of the whole MSM population participated in EMIS. On the other hand, the Law of Large Numbers would suggest that for the larger country samples, range is adequately represented. The three clusters which emerged of countries based on anti-gay discrimination are consistent with clusters of countries reported by Lottes and Akula (23) on self-expressed sexual values, including justification of homosexuality, in a pan-European sample. For groups who are discriminated against and highly stigmatized, there is no good alternative to Internet data collection for a study of this size. However, Internet biases are, from previous studies on sexuality, known and quantifiable.

Structural variable relationships of IH

These data demonstrate the possible paths connecting anti-gay discrimination at legal and demographic levels with IH, along with size of place of residence. The relationship is clear despite relatively low variance in the tripartite cluster-based classification of country by legal and experienced discrimination level. Levels of IH are closely and linearly related to the "liberal", "moderate" and "conservative" clusters, providing criterion validity linking levels of discrimination and IH. IH in turn is closely associated with younger age, social measures of being "out" and connected with gay peers, which in turn are associated with HIV test-taking (Figure 3). While the effect size of a $\beta < .1$ is minor, generally, the greater the distance of a structural variable from an individual, the more difficult it is to achieve a large effect size. Paths from social climate variables to IH and behavior are measurable and quantifiable, given that this study has power to detect theoretically important differences from the "background radiation" of structural and social climate factors at a country level. While at the individual data level the study appears overpowered, at the country variable level the n is only 38. Figure 2 indicates graphically the relationships between IH and both structural and behavioral variables.

HIV testing and IH

Higher IH is also associated with decreased levels of ever HIV test-taking as mediated by "outness" (but not directly), and denying that their sexual conduct is always as safe as the respondents want it to be (Perceived Control over Sexual Risk-Taking). Thus, higher IH appears to both discourage HIV testing (which may be considered a marker of acknowledgement of stigmatized status) and also to reduce the ability to have safe sex despite the intention to do so.

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Diversity of sexual behavior (Figure 2) also appears to be restricted by IH, with lower sexual repertoire, possibly because of interactions limited by time, locale or anonymity.

Condom use and IH

Condom use for anal intercourse (controlling for number of non-steady sexual partners for anal sex, and the Perceived Control over Sexual Risk-Taking) revealed a relationship of lower IH with increasing condom use (Figure 2). This suggests that IH is associated with risky sexual behavior generally and condom use specifically . This unexpected implication of degree of control over sexual risk taking bore further investigation. Table 4 examines the stepwise predictors of Perceived Control over Sexual Risk-Taking and implicates structural variables (Gini coefficient, LGB legal climate), IH and age, plus the existence of social networks and being "out". How these variables amalgamate into lack of control over safe sex may involve fear, lack of access to condoms, surreptitious or no safety negotiations, lack of good preventive information, or need for rapid or anonymous sex, among other factors. Perceived Control over Safe Sex may have similarities to self-efficacy, and relationships between condom self-efficacy and structural discrimination and its internalization warrants further investigation.

Paths between structural variables, IH and HIV Risks

These data indicate relationships between level of legal and experienced discrimination and IH, and in turn between IH and both outness and gay peer contact, and HIV risk behaviors. HIV risk behaviors associated with high IH include lower levels of HIV testing (not knowing HIV status and/or receiving treatment being a risk), lower levels of perceived control over safe sex, and with lower levels of condom use for anal sex when this safe sex volition and partner numbers are controlled for. The relationship of the Gini coefficient and IH is interesting and here the Gini coefficient probably represents a level of attitude to equality beyond the purely economic (Figure 2) and is consistent with the association found between sexuality-related attitudes and human development indices (15,16, 23) in previous pan-European research.

Consistency with previous data

These findings on IH are consistent with previous data of Shoptaw et al. (9) on IH, albeit using a different IH measure, in African American MSM in Los Angeles, including their finding that IH is associated with lower HIV testing and education levels. It is also consistent with the pathways that Ross et al. (10) described in HIV seropositive U.S. MSM, where IH is associated with risk behavior through less openness, discomfort with discussion of sexuality, not discussing HIV status, and lower condom use. The finding that there is a higher level of risk behavior (non-use of condoms with casual partners) is also consistent with the data of Ryan (11) in relation to the impact of family homonegativity in adolescents, and Sandfort on the impact of school psychological environment on mental health of Dutch LGB adolescents (24).

Impact of homophobic climate and IH and potential intervention levels

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These data suggest, however, that IH may have pervasive effects on sexual behavior related to HIV prevention through the association of a homonegative legal and social climate with higher levels of risk and lower levels of preventive behaviors, at both personal and probably policy levels, although more research is required to elucidate these. Hatzenbuehler et al. (25) note that state-level protective policies modify the effect of sexual orientation on mental health disorders, and it is logical that one of the mechanisms for this may be through reduction of institutional discrimination, hate crimes, homonegativity and providing interventions to reduce internalized homonegativity.

The public health implications of these data are four-fold. First, it is clear that interventions must incorporate changes in the legal and policy climate (and perhaps religious climate) with regard to MSM. Second, such climate changes need to be communicated to professionals (including health care workers) who are at the government or professional interface with MSM clients, possibly with appropriate in-service training. Third, structural interventions should translate into the provision of specific services or outreach to MSM. Fourth, anti-IH measures for MSM might include individual-level opportunities on the Internet anonymously targeting stigmatized sexual minorities. These could be based on short, easily read informational modules, reduction of pathological stereotypes through pride-enhancing modules, role-model stories, and approaches to respond to the negative "voice within" or distancing strategies. The success of this study in reaching some 180,000 MSM via the Internet in three months, in 25 languages, in this study indicates the potential of this medium.

As far as we are aware, no study in Europe has previously looked at HIV-preventive behavior and homonegativity. From these pan-European data, homonegative stigma can be clearly linked through IH to increased HIV risk in MSM at both population and personal levels. Discrimination is bad law, bad policy, bad psychology and bad medicine: reducing homonegative policy and interactions at legal and social levels will have positive health as well as human rights impacts on MSM populations.

Acknowledgements: The EMIS Network thanks the more than 180,000 men who responded to the survey, the more than 235 websites who placed our banner, and particularly those who sent individual messages to their users: PlanetRomeo, Gaydar, Manhunt, Qruiser, and Qguys. We also thank all NGOs who promoted our survey. Without this help, EMIS's success would not have been possible.

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Table 1: Demographic characteristics of MSM with Internalized Homonegativity scores

Top level domain	Country	*n* with IH score[1]	Median age	% Live in City > 500,000	% Tertiary education	% Employed[2]	% now in relationship with a man
at	Austria	3046	30	47.6	31.6	71.7	40.3
ba	Bosnia & Herzegovina	103	28	15.3	53.9	57.8	22.5
be	Belgium	3075	33	44.3	67.4	72.0	46.0
bg	Bulgaria	767	27	66.3	59.9	67.9	35.6
by	Belarus	296	27	63.5	68.9	79.7	53.4
ch	Switzerland	3819	36	13.3	47.8	80.0	43.4
cy	Cyprus	209	30	3.0	64.4	74.2	28.7
cz	Czech Republic	1809	27	46.6	42.9	65.3	50.1
de	Germany	39799	33	42.0	33.3	73.3	42.7
dk	Denmark	1254	33	52.5	50.4	67.6	35.6
ee	Estonia	469	30	9.2	48.4	72.7	40.0
es	Spain	9690	31	51.2	59.5	65.4	31.6
fi	Finland	1642	33	39.0	51.2	68.9	43.7
fr	France	8837	34	52.4	74.7	68.6	47.5
gr	.Greece	2214	30	70.5	65.9	69.3	35.4
hr	Croatia	410	29	54.3	64.5	62.9	36.8
hu	Hungary	1502	28	67.1	69.3	70.2	44.7
ie	Ireland (Republic)	1701	31	50.1	70.9	70.3	29.0
it	Italy	11905	33	35.6	43.9	68.8	37.2
lt	Lithuania	423	27	47.7	73.8	72.1	47.5
lu	Luxembourg	209	34	3.4	54.3	75.4	40.4
lv	Latvia	540	30	62.4	49.7	79.6	46.1
md	Moldova	87	24	62.8	59.8	64.4	49.4
mk	Macedonia	86	28	62.8	82.6	69.8	27.9
mt	Malta	95	33	1.1	61.1	85.3	39.4
nl	Netherlands	2903	39	42.2	62.4	76.9	45.4
no	Norway	1555	30	42.2	64.7	68.1	33.9
pl	Poland	1631	28	64.3	75.5	67.1	45.8
pt	Portugal	3858	30	43.5	60.1	69.5	39.0
ro	Romania	1593	27	46.7	58.3	67.4	38.5
rs	Serbia	822	28	54.6	56.6	54.9	33.6
ru	Russia	4041	30	79.2	73.5	83.7	52.7
se	Sweden	2215	35	54.8	55.6	73.5	40.5
si	Slovenia	673	30	1.8	47.5	64.3	39.5
sk	Slovakia	422	26	26.7	49.6	62.5	44.1
tr	Turkey	1312	28	87.7	85.0	65.3	34.5
ua	Ukraine	1332	29	70.7	76.0	83.2	50.9
uk	United Kingdom	13851	36	51.0	64.7	75.2	36.0

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[1]83.2% overall have IH scores
[2]Excludes students and unemployed
[3] 0-6 scale

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Table 2: Univariable analysis: predictors of ever testing for HIV

Variable	Untested	Ever tested for HIV	Statistic*
Cramer's Φ			
	%	%	
Being "out" to family/friends/colleagues (=Outness)			
All or almost all	16.2	83.8	
More than half	24.1	75.9	
Less than half	29.7	70.3	
Few	39.4	60.6	
None	57.3	42.7	0.28
Proportion of male friends attracted to men			
Almost all	14.8	85.2	
More than half	16.3	83.7	
Approximately half	20.2	79.8	
Less than half	28.5	71.5	
Almost none of them	44.6	55.4	
Have no male friends	45.6	54.4	0.26
Education (6 levels of ISCED**)			
No secondary qualification	38.5	61.5	
Some high school/trade qualification	34.2	65.8	
Lower secondary education	30.1	69.9	
Upper secondary education	33.2	66.8	
Higher education below degree level	24.4	75.6	
University degree completed	19.1	80.9	0.13
Size of settlement			
Very big city or town (1 million or more)	19.4	80.6	
Big city or town (½ to 1 million)	23.1	76.9	
Medium city (100,000 to ½ million)	28.5	71.5	
Small city (10,000 to 100,000)	35.0	65.0	
Village or rural area (<10,000)	36.7	63.3	0.15
	mean±SD		Cohen's *d*
Internalized Homonegativity	1.85±1.31	1.37±1.18	0.40
Age	30.43±11.56	35.56±10.60	0.47

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*Given sample size of 144,177 significance is not shown (144,177 cases with IH score are 82.8% of eligible cases with consistent data).
** The 6 levels of the International Standardised Classification of Educational Degrees.

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Table 3: Path analysis of Internalized Homonegativity and HIV-related risk behaviors

	β*	B	95% CI of B
Analysis 1			
Step 1: Structural variables predicting Internalized Homonegativity			
LGB legal climate (country level)	-.14	-.16	-.14 - -.13
Gini Coefficient (country level)	.09	.03	2.41 - 2.73
Size of settlement (individual level)	.08	.07	.06 - .07
Step 2: Individual demographic and behavioral variables predicting Internalized Homonegativity			
"Outness"	-.51	-.30	-.30 - -.31
Age (per year)	-.08	-.01	-.01 - -.01
Step 3: IH, social and demographic variables predicting having HIV test			
Internalized Homonegativity (per 1)	-.01	-.01	-.01 - -.01
"Outness"	-.21	-.07	-.07 - -.06
Proportion of gay friends	-.14	-.04	-.04 - -.04
Education	.10	.04	.04 - .03
Age (per year)	.17	.01	.01 - .01
Analysis 2			
Internalized Homonegativity as predictor of sexual variables			
Perceived control over sexual risk-taking (Y/N)	-.15	-.18	-.17 - -.19
Sexual diversity	-.01	-.01	0.01 – 1.01
Ever had an HIV test (Y/N)	-.13	-.40	-.38 - -.42
Relative frequency, condom use, non-steady partners past year	.03	.03	.03 - .03

* Which form path coefficients in Figure 3.

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Table 4: Stepwise predictors of Perceived Control over Sexual Risk Taking.

	β	B	95% CI of B
Number of non-steady partners in past 12 months	-.21	-.07	-.07 - -.06
Internalized Homonegativity	-.12	-.10	-.10 - -.09
GINI Coefficient	-.11	-.03	-.03 - -.03
LGB Legal climate	.03	.02	.01 - .03
Age	.03	.02	.02 - .03
Education	.02	.01	.01 - .02
Outness	-.02	-.02	-.02 - -.01
Proportion of gay friends	.01	.01	.01 - .02

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Figure 1:

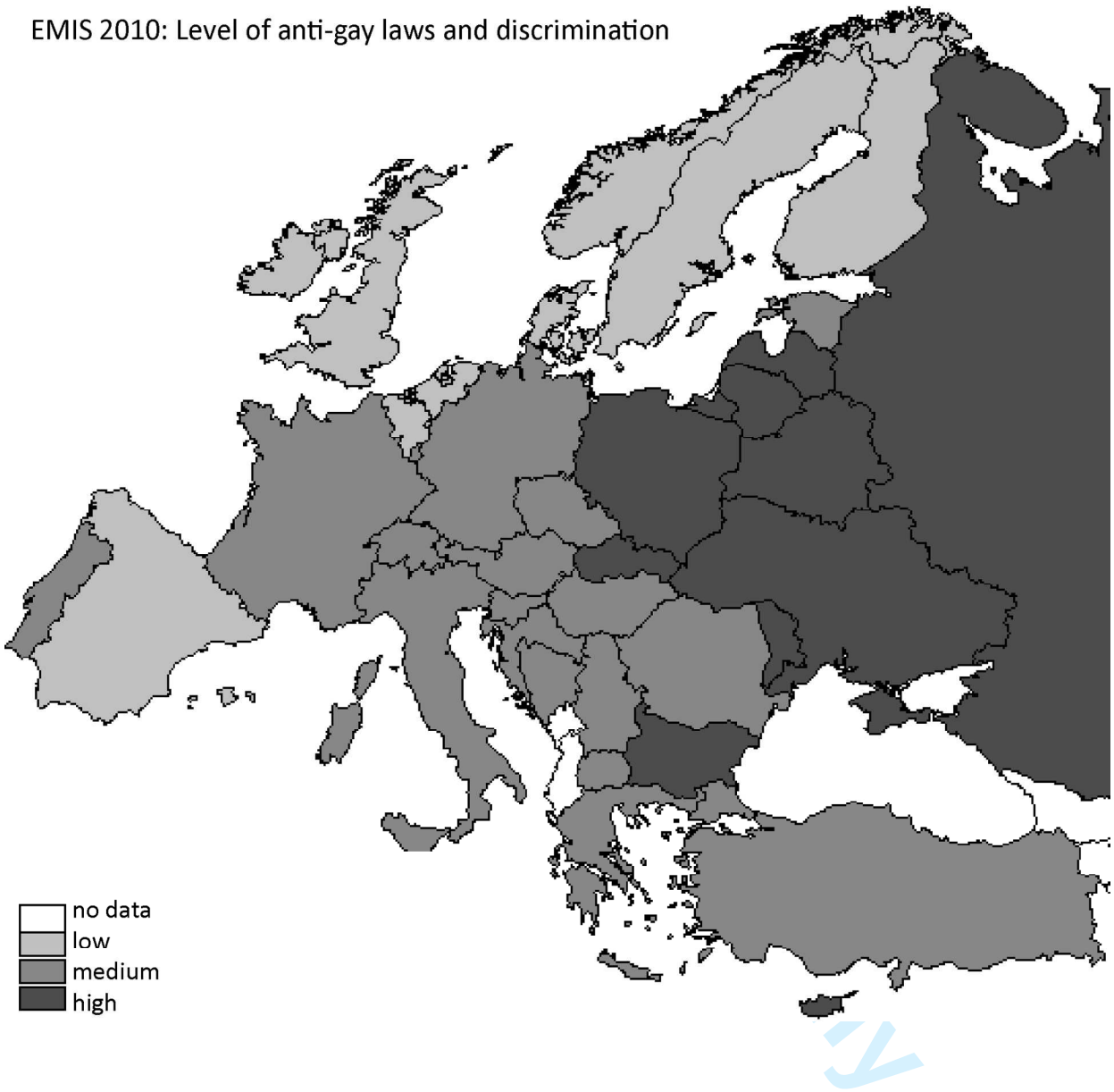

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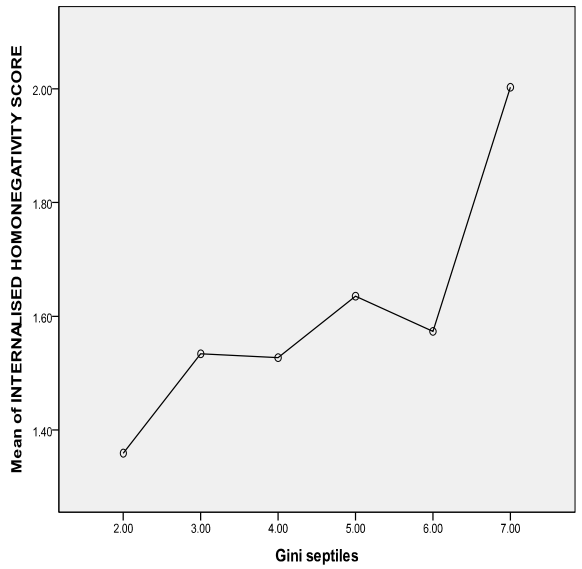
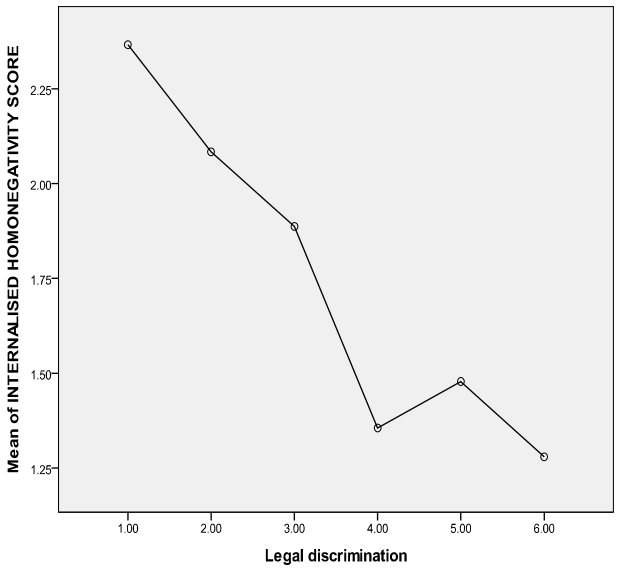
Figure 2: Relationship of Internalized Homonegativity to Social and Behavioral Variables

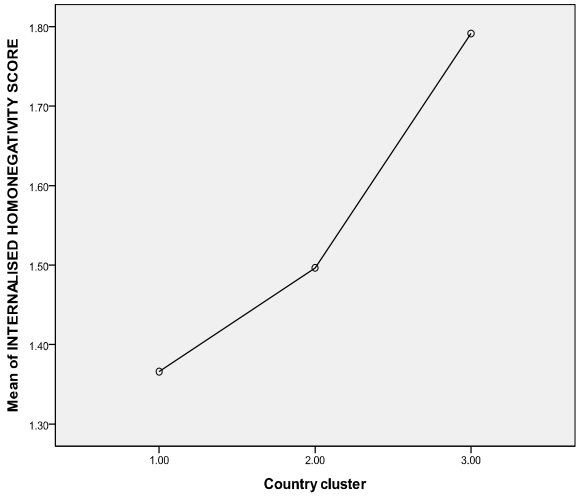
Relationship of Internalized Homonegativity to Gini Coefficient sextiles



Relationship of Internalized Homonegativity to Gay Legal Discrimination Index



Relationship between IH and Country Cluster



1=”liberal”; 2=”moderate”; 3=”conservative”

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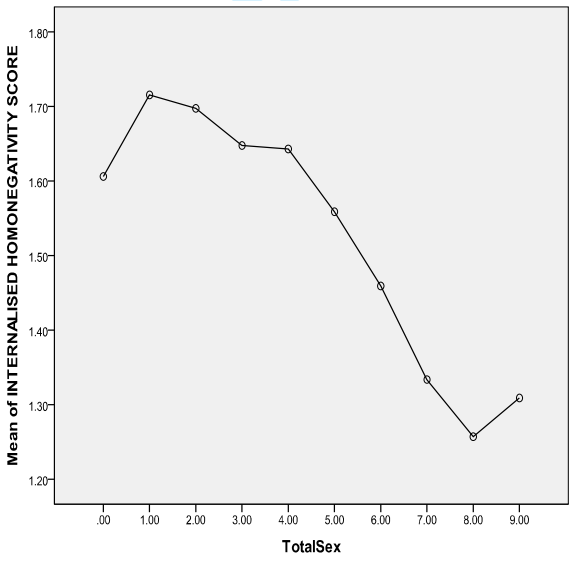
Relationship of Internalized Homonegativity to Sexual Diversity Score



Internalized Homonegativity score by Condom use for Anal intercourse with Non-steady Partners in past 12 months

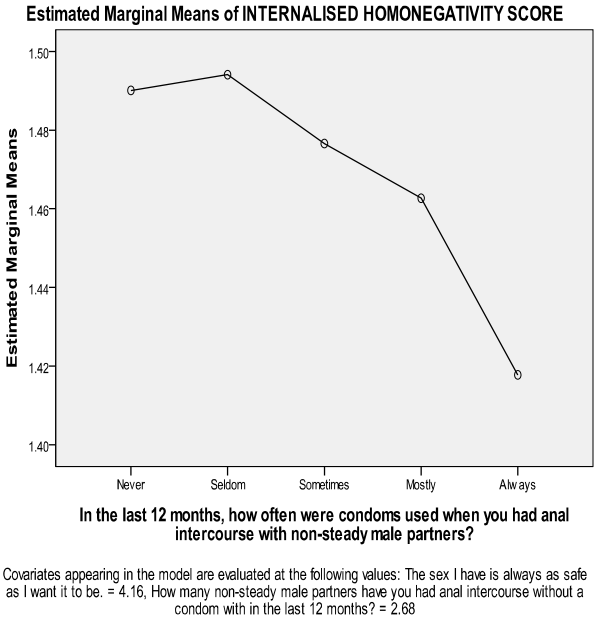


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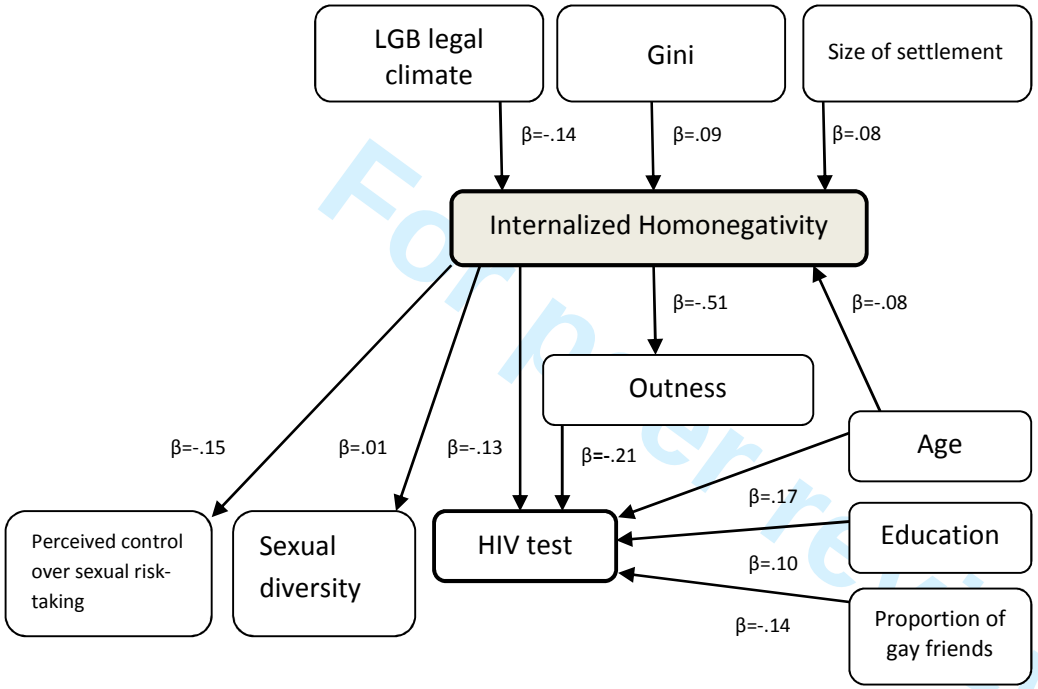
Figure 3: Paths Associated with Internalized Homonegativity



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(Draft 11, November 2 2012)

Internalised Homonegativity predicts HIV-Associated Risk Behavior in European Men who have Sex with Men in a 38-Country Cross-sectional Study: Some Public Health Implications of Homophobia ~~for Gay Men~~

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~~(3,020 words)~~

Abstract

Objectives: Internalised Homonegativity (IH) is ~~associated with poor mental health in gay, lesbian and bisexual people and is~~ hypothesised to be associated with HIV risk behavior and HIV testing in men who have sex with men (MSM). We sought to determine the social and individual variables associated with IH and the associations between IH and HIV-related behaviours.
Design and setting: We examined IH and its predictors as part of a larger ~~anonymous~~ Internet-delivered, cross-sectional study on HIV and health in MSM in 38 European countries.

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Participants: 181,495 MSM, IH data analysis subsample 144,177. All participants ~~had to be~~ were male, over the age of consent for homosexual activity in their country of domicile, and have had at least one homosexual contact in the past 6 months.
Methodology: An anonymous Internet-based questionnaire was disseminated in 25 languages through MSM social media, websites and organizations ~~in 2010~~ and responses saved to a UK-based server. ~~Questions covered the domains of demographics, HIV risk behavior, testing and treatment, sexual behavior, discrimination, drug use, and sexual attitudes.~~ IH was measured using a standardized cross-culturally appropriate scale. ~~There was no incentive for participation.~~
Results: ~~Cluster analysis indicated 3~~ Three clusters of European countries based on level of experienced discrimination emerged. IH was predicted by country - LGB legal climate, Gini~~INI~~ coefficient, and size of place of settlement. Lower IH ~~in turn~~ was associated with degree the respondent was "out" as gay to others, and older age. "Outness" was ~~strongly~~ associated with ever having an HIV test and age, education and number of gay friends, while IH (controlling for number of non-steady unprotected sex partners and perceived lack of control over safe sex) was associated with ~~perceived control over sexual risk taking and~~ condom use for anal intercourse.
Conclusions: IH is associated with - LGB legal climate, economic development indices, and urbanization. It is also associated with "outness" and with HIV risk and preventive behaviors including HIV testing, perceived control over sexual risk, and condom use. ~~These data confirm that h~~Homonegative climate is associated with IH and higher levels of HIV-associated risk in MSM. Reducing IH through a~~A~~ttention to LGB human rights - may be~~is an~~ appropriate HIV reduction intervention for MSM.

Article Focus:

- Internalized Homonegativity (IH) has been implicated as a variable associated with HIV risk behaviours.
- We examined the paths associated with IH in a study of over 140,000 MSM in 38 European countries
- We established several social structural variables acting through IH to influence HIV testing and condom use

Key Messages:

- Gay legal discrimination, size of place of residence and Gini coefficient of economic inequality were macro or country-level variables that influenced IH
- IH in turn influenced being "out" and through that HIV testing
- Perceived control over safe sex and condom use were predicted by IH and the country-level variables

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Strengths and Weaknesses:

- The study had a large *n* and with 38 countries, we were able to demonstrate that countries clustered onto a single discrimination continuum
- We demonstrate linkages between macro-level (country), meso level (community) and micro (individual level) variables including HIV-associated risk behaviour
- Effect sizes were sometimes small and of theoretical rather than practical importance

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Introduction

Disease has classically been associated with disadvantage, with lower socioeconomic and occupational status being associated with chronic disease (1). Infectious disease has also been disproportionately associated with disadvantage, along with access to health services (expressed by Hart's inverse care law that those who are most in need of health care have the lowest access to it (2)). These patterns of disadvantage extend to targets of discrimination, including women and racial and ethnic minorities (3). More recently, structural inequalities such as income distribution have been implicated in poor health outcomes and access (4).

Discrimination is largely based on obvious stigmatizing characteristics such as race or appearance (5) and little attention has been paid to less visible or invisible stigmatizing statuses, such as homosexuality and homosexual behavior. As Ross (6) found, there is no close link between *experienced* discriminatory acts and *expectation* of discrimination, because those homosexual men who anticipate the worst outcomes remain the most hidden, and thus less likely to *experience* discrimination. Poor mental health has been hypothesized (7) to result from iInternalization of negative attitudes and assumptions about homosexual people, commonly described as "homophobia". Internalized Homonegativity (IH), internalization of negative attitudes and assumptions about homosexual people by homosexuals themselves, leads to feelings of guilt, inferiority and lack of self-worth. Meyer (7) summarizes the evidence and places IH into the conceptual framework of minority stress, in which prejudice, stigma, and discrimination create a hostile and stressful social environment that may cause mental health problems.

Recent data indicate that IH is directly associated with mental health outcomes (8), with avoidance of HIV testing and identification as bisexual or straight in men who have sex with men (MSM) (but not HIV risk behaviors when sexual identification and race/ethnicity were controlled for) (9), and indirectly through the mediators of discomfort with discussing HIV status and condom use (10). Ryan et al. (11) found that family rejection of gay and lesbian adolescents was associated with an 8.4 times higher likelihood of attempting suicide, 5.9 times higher likelihood of depression, 3.4 times higher levels of using illegal drugs, and a 3.4 times higher risk of engaging in unprotected intercourse compared with teens who reported no or low levels of family rejection. A recent review of US studies (12) concluded that IH has minimal effect on risk behavior, although that conclusion has been criticized for being based largely on US data and for assuming a linear relationship between the two variables (13). However, Ross et al. (14) have demonstrated that IH predicts sexual risk behavior in gay men in Uganda, where homosexuality is heavily stigmatized. The data suggest that IH may vary significantly from country to country as a function of levels of discrimination at legal and structural levels as well as individual experience: that is, ambient homophobia is a major determinant of IH. European data from over a decade ago indicate that general population homonegativity is negatively associated with religion and immigration, and positively associated with urbanization and

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economic development (15, 16). EMIS is a European study with a unique opportunity to research IH in a range of political and social settings.

The European MSM Internet Survey (EMIS) (17) in 38 European countries is the first pan-European survey of MSM, by European researchers, and provides an opportunity to examine IH and both its structural predictors and its associations with HIV risk behavior in a large and geographically diverse sample, with sufficient countries to enable analysis by country-level (macro) as well as local (meso) and individual (micro) level variables. A short form of Ross and Rosser's IH scale has recently been developed with culturally stable items (18, 19) to make this possible. We report on an analysis of IH levels by country structural variables including legal discrimination and income inequality, and levels of experienced discrimination, and in turn its associations with HIV testing and preventive sexual behavior. We hypothesize that IH will be influenced by legal climate regarding LGB (Lesbian, Gay and Bisexual) variables and possibly other structural issues, and that IH will itself be associated with MSM's visibility and social context, and HIV-related prevention behaviors including HIV testing and condom use.

Methods

The methods of the European MSM Internet Survey have been described in ~~great~~ detail elsewhere (Weatherburn et al., submitted). In brief, EMIS is a joint project of academic, governmental, and non-governmental partners from 3~~8~~5 countries in Europe (EU and neighbouring countries) to simultaneously run an online survey in 25 different languages during summer 2010. EMIS was designed to inform the planning of prevention interventions for MSM by identifying prevention needs commonly unmet across MSM (priority aims), as well as subgroups of MSM who have many prevention needs poorly met (priority target groups).

Promotion and recruitment

The Internet-based self-completion survey study was promoted online and offline through various media for gay, bisexual, and other men who have sex with men (MSM) under the slogan 'Be part of something huge!' More than 235 local, national, and international Lesbian Gay Bisexual Transgender (LGBT) websites, undertook online recruitment and many of these organi~~z~~zations also promoted the survey offline, via posters, recruitment cards and face-to-face interaction. By visiting a promotion website men were exposed to banner advertisements inviting them to participate in the study. PlanetRomeo, Manhunt, Qruiser, Qguys, and Gaydar sent individual messages to their users inviting them to complete the survey. By clicking on the banner or the study link, potential respondents were directed to a survey "landing page" and asked to choose one of 25 languages for completion. Once they had chosen a language the first page described the study, including its purpose, its voluntary and anonymous nature, and gave contact information on how to contact the researchers.

Men were eligible to participate if they were: living in Europe, at or over the age of homosexual consent in the country they lived in, sexually attracted to men and/or having sex with men. They

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also needed to indicate that they understood the nature and purpose of the study and consented to take part.

The survey was physically located on servers owned and administered by the company Demographix.com, whose staff was responsible for testing it across different computer platforms/operating systems and with different web-browsers, and managing the technical aspects including back-ups and data delivery to the researchers. The data were protected with a 128-bit SSL encryption server, not accessible to the public. We neither collected the IP-address of participants' computers nor installed any cookies on it. The survey was available online between June 4 and August 31, 2010. EMIS could be completed in any of 25 languages, and the questions were identical in each language version. It took 21minutes to complete the survey on average. No study recompense was offered. All study procedures were approved by the Research Ethics Committee of the University of Portsmouth, UK (REC 08/09:21).

Data preparation and analysis

At the close of fieldwork there were 184,469 cases in the consolidated file. Partially completed surveys (moving away from the web page before pressing 'submit') were not captured. When downloaded 3 cases were lost due to data corruption and 2,427 cases were removed from the dataset because they gave no country of residence or a country of residence outside the study area. A further 544 cases were removed on the basis they were women, or men with no homosexual desire or experience, gave no age, or were under 13 or over 89 years old. This left a total of 181,495 cases meeting the qualifying criteria. Data from 291 cases from European countries and states that did not reach 100 qualifying cases were removed as were 6,995 cases with more than one inconsistency, defined as answers to two questions which cannot both be valid. Inconsistent data could be submitted by moving backwards and forwards in the survey and changing previously given answers. It could also be submitted simply by supplying inconsistent answers across one or more questions. Given the length and complexity of the survey, we allowed respondents to have one inconsistency in their given answers; but we excluded all cases with more than one inconsistency, suggesting giving random answers which is to be expected in a low-threshold questionnaire like EMIS. This left an analytic sample of 174,209 MSM from 38 European countries (17).

Measures and Analysis

Measures Analyses, unless otherwise indicated, were carried out using SPSS version 19.

Legal climate was measured by scoring the presence of the 6 legislative measures of LGB status (legal discrimination) listed by Wikipedia (20) in with a high score of 6 for presence of all legislative protections (homosexual acts are legal, recognition of same-sex relationships, same sex marriage, same-sex adoption, gays serve in the military, LGB antidiscrimination laws).

IH was scored according to the criteria described by Ross et al. and Smolenski et al. (18,19) as an additive scale of 7 items, ranging from 0 to 6 (Cronbach's $\alpha = 0.70$).

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Education was measured using the 6 levels of the International Standardizsed Classification of Educational Degrees (ISCED) corresponding to the educational system of each country.

"Outness" – defined as the proportion of people one is out to as gay or bisexual (family, friends, work or study colleagues) – was measured on a 5-point Likert scale from "all or almost all" to "none".

Proportion of male friends who are also attracted to men was measured on a 6-point Likert scale from "almost all of them" to "almost none of them" and "I don't have any male friends".

~~Size of settlement was measured on a 5-point scale from a "a very big city or town (a million or more people)", to "a village /the countryside (less than 10,000 people)".~~

Having ever had an HIV test was a binary (yes/no). We compared this binary variable with the extended variable of how long ago the respondent had had an HIV test (24 hours, 7 days, 1 month, 6 months, 12 months, 5 years, more than 5 years ago) and found that the two measures correlated 0.88. We thus decided to use the binary measure in analyses, particularly given the non-linear nature of the time measure.

Perceived control over sexual risk-taking was measured on a 5-point Likert scale anchored by "strongly agree" "and strongly disagree" with the statement "The sex I have is always as safe as I want it to be".

Relative frequency of condom use with non-steady partners was measured as "In the last 12 months, how often were condoms used when you had anal intercourse with non-steady male partners?" (6-point Likert scale "all or almost all" to "none").

The number of non-steady anal intercourse (AI) partners was asked as "How many non-steady partners did you have anal intercourse with in the last 12 months? (number).

Sexual diversity of practice: EMIS asked for the recency of a range of sexual practices with non-steady partners. Although this set was originally designed to reflect certain transmission routes for HIV and STIs, it can serve as a proxy for diversity of sexual practices, even if sexual practices with steady partners are not included. Sexual diversity was the sum of the 9 different types of sexual behaviors with non-steady partners reported in the past 6 months (mutual masturbation, oral insertive, oral receptive, anal insertive, anal receptive, rimming, being rimmed, and insertive and receptive "fist-fucking". These were recoded as binaries to reflect engaging in them or not in the past 6 months and summed to form a measure of the relative diversity of the respondents' sexual repertoires (Cronbach's $\alpha = 0.77$).

Size of settlement was measured on a 5-point scale from a "a very big city or town (a million or more people)", to "a village /the countryside (less than 10,000 people)".

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Legal climate was measured by scoring the presence of the 6 legislative measures of LGB status (legal discrimination) listed by Wikipedia (20) in with a high score of 6 for presence of all legislative protections (homosexual acts are legal, recognition of same-sex relationships, same sex marriage, same-sex adoption, gays serve in the military, LGB antidiscrimination laws).

The Gini coefficient of income inequality in a country was extracted from the UN Human Development Report coefficient for all countries (2008) with the exceptions of Cyprus, Malta, Luxembourg and Serbia, which were derived from an identical calculation method using the CIA Gini score (2008). The Gini coefficient ranges from 0 (all people in a country have equal income) to 1.0 (one person has all the income). It serves as a general economic measure of distribution of wealth.

~~Table 2 illustrates the response categories for participants with valid IH score.~~

Analyses

Analyses, unless otherwise indicated, were carried out using SPSS versions 19 and 20, on the 38 country dataset (Table 1). Cluster analysis of the 38 countries was carried out using SPSS 19~~8~~: a two-step procedure using Euclidian distances was employed, entering three variables: country LGB legal discrimination scores, proportion of MSM reporting verbal abuse, and proportion of MSM reporting physical violence because someone knew or presumed they were attracted to men. Three country clusters emerged including 9, 17, and, respectively, 12 countries~~,~~; with good fit (Silhouette coefficient of cohesion and separation = 0.65; Figure 1).

Bivariate analyses were carried out using χ^2 with Cramer's Φ as measure of effect size for ordinal data, and *t*-test (using Cohen's D as measure of effect size)(Table 2). Effect size statistic for univariable ANOVA for interval or ratio level data was η^2. Because of the large size of the sub-sample with valid IH scores (N=144,177), almost all analyses were highly statistically significant so *p* levels are not reported. Means of IH were graphed against selected structural and behavioral variables in Figure 1 to illustrate the relationship between variables. Regression analysi~~e~~s in Table 3 was ~~were~~ carried out by linear regression for interval- or ratio-level dependent variables using simultaneous entry in hierarchical blocks of individual demographic variables, individual behavio~~u~~ral variables, plus external source country level variables. Path coefficients calculations appear in Table 3 and in Figure 3 are reflected by β from the linear regressions in Table 3, ~~and~~ with path arrows indicate direction of ~~actual or~~ temporal relationship (e.g., IH cannot affect age so the relationship has to be in the opposite direction), or predicted relationship in the model. Stepwise linear regression was carried out for variables predicting Perceived Control over Sexual Risk-Taking in Table 4 to allow variables to enter in a forward hierarchical model.

Results.

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Basic demographic data are presented in Table 1 from participants with valid IH data. These data from 38 countries illustrate the *n*s for each country (ranging from 86 in Macedonia to over 39,000 in Germany), median age (ranging from 24 in Moldova to 36 in Switzerland and the UK), % living in a city >500,000 population (ranging from 3% in Malta to 87.7% in Turkey), % with tertiary education (ranging from 31.6% in Austria to 85.0% in Turkey), % employed (ranging from 54.9% in Romania to 85.3% in Malta), and % now in a relationship with another man (ranging from 22.5% in Bosnia-Herzegovina to 53.4% in Belarus to 53.4% in Belarus). IH scores ranged from 1.22 in The Netherlands and 1.23 in Sweden, to 2.57 in Bulgaria and 2.54 in Bosnia-Herzegovina.

~~Table 2 illustrates the bivariate associations with strong effect sizes predicting ever having had an HIV test, specifically being "out" and proportion of MSM friends, followed by education and size of settlement.~~ Data from the 38 countries clustered into three groups using (a) measures of legal climate supporting LGB rights, (b) proportion experiencing verbal discrimination, and (c) physical violence~~discrimination~~ because of assumed homosexuality. The three clusters of countries (Figure 1) characterized a group of "liberal" Scandinavian countries~~Northwestern~~ (Denmark~~dk~~, Finland~~fi~~, Norway~~no~~, Sweden~~se~~) Western (Belgium~~be~~, ~~fr~~, Ireland~~ie~~, ~~n~~The Netherlands~~l~~, United Kingdom, Spain~~uk~~) ~~and West-Central (at, ch, de, lu),~~ European countries~~;~~ a group of "~~"~~moderate"~~"~~ Central and Mediterranean countries~~Southwestern~~ (France, Portugal, Germany, Czech Republic, Switzerland, Italy, Austria, Slovenia, Hungary, Croatia, Bosnia-Herzegovina, Romania, Macedonia, Greece, Turkey, Estonia~~es, it, gr, pt~~) ~~and East-Central (cz, si, sk, hu, pl) European countries~~; and a group of "~~"~~conservative"~~"~~ Southeastern ~~(ba, bg, cy, hr, mt, ro, rs, tr)~~, Northeastern ~~(ee, lt, lv)~~, and Eastern European countries (Poland, Slovakia, Belarus, Lithuania, Latvia, Russia, Ukraine, Moldova, Bulgaria, Cyprus~~by, md, ru, ua~~), countries characterized by the highest levels of discrimination (note that IH was not part of the equation for this clustering process). Clustering countries on the basis of legal and self-reported personal discrimination against MSM provided both a potential validation of the measure of IH, and a means of conceptualizing geographic sub-sets of levels of discrimination (Figure 2). IH was closely related to the three discrimination-based clusters, with highest IH in the "conservative" countries and lowest IH in the "liberal" cluster of countries.

Using the measures of LGB legal climate (the strongest predictor), Gini coefficient, and size of ~~location~~ place of residence all predicted IH (Table 3, Figures 2 and 3). IH, in turn was associated with outness and age. The HIV-associated behavior most closely associated with IH were (a) ever being tested for HIV (mediated by outness), and (b) a perception of having no control over sexual risk-taking. Sexual diversity had a smaller impact. HIV testing was predicted, following outness as the major component, by the proportion of gay friends, highest educational attainment, and age.

A second linear regression limited to the demographics, HIV testing, "outness" and perceived control over sexual risk-taking onto IH indicated that those most closely associated with IH were lack of control over sexual risk-taking, and not being tested for HIV.

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Bivariate relationships between IH and country cluster, Gini coefficient septiles, LGB legal climate (Figure 2) show a relationship between these variables and IH. Sexual diversity illustrates (Figure 2) an increase in sexual diversity with decreasing IH and a more limited range of sexual activity with higher IH.

Table 2 illustrates the bivariate associations with strong effect sizes predicting ever having had an HIV test, specifically being "out" and proportion of MSM friends, followed by education and size of settlement.

Analysis of variance of IH score by relative frequency of condom use with non-steady partners, with covariates the number of non-steady partners that they had unprotected anal intercourse with in the past year and Pperceived Ceontrol over Ssexual Rrisk-Ttaking, demonstrated a small to moderate effect size (η^2=.03). An accelerating relationship between IH and relative frequency of condom use (covariates perceived control over sexual risk, and number of casual partners in the past year) with non-steady male partners was apparent (Figure 2). The strong relationship of Perceived Control over Sexual Risk-Taking in Figure 2 with condom use lead to an additional analysis of the predictors of this Perceived Control (Table 4). The highest stepwise predictors were number of non-steady partners one had anal intercourse with in the past 12 months; IH; GINI coefficient; and LGB legal climate.

Discussion

While these data represent 144,177 MSM in 38 countries, their collection via Internet constitutes a non-random sample. Previous Swedish data comparing Internet sexual data collection with questionnaire data from a large national random sample from a sexuality study in the same country (21, 22) indicate that general Internet samples tend to be somewhat younger, more likely to be single, better educated and urban., although Internet samples of MSM may be more bisexually-identified, worse educated and rural compared with traditional *gay venue questionnaire-based* samples in Sweden. The Swedish data indicate the known biases for Internet samples by comparing them with a national "gold standard" study. TThe EMIS data, are likely to be biased toward those who are better educated and Internet-literate, and probably more identified and familiar with the gay subculture. This sampling problem biaswill be more substantial in Eastern European countries where household Internet access is less common and smaller proportions of the whole MSM population participated in EMIS. On the other hand, the Law of Large Numbers would suggest that for the larger country samples, range is adequately represented. The three clusters which emerged of countries based on anti-gay discrimination are consistent with clusters of countries reported by Lottes and Akula (23) on self-expressed sexual values, including justification of homosexuality, in a pan-European sample. For groups who are discriminated against and highly stigmatized, there is no good alternative to Internet data collection for a study of this size. However, Internet biases are, from previous studies on sexuality, known and quantifiable.

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Structural variable relationships of IH

These data demonstrate the possible paths connecting anti-gay discrimination at legal and demographic levels with IH, along with size of place of residence. The relationship is clear despite relatively low variance in the tripartite cluster-based classification of country by legal and experienced discrimination level. Levels of IH are closely and linearly related to the "liberal", "moderate" and "conservative" clusters, providing criterion validity linking levels of discrimination and IH. IH in turn is closely associated with younger age, social measures of being "out" and connected with gay peers, which in turn are associated with HIV test-taking (Figure 3). While the effect size of a $\beta < .1$ is minor, generally, the greater the distance of a structural variable from an individual, the more difficult it is to achieve a large effect size. Paths from social climate variables to IH and behavior are measurable and quantifiable, given that this study has power to detect theoretically important differences from the "background radiation" of structural and social climate factors at a country level. While at the individual data level the study appears overpowered, at the country variable level the n is only 38. Figure 2 indicates graphically the relationships between IH and both structural and behavioral variables.

HIV testing and IH

Higher IH is also associated with decreased levels of ever HIV test-taking as mediated by "outness" (but not directly), and denying that their sexual conduct is always as safe as the respondents want it to be (Perceived Control over Sexual Risk-Taking). Thus, higher IH appears to both discourage HIV testing (which may be considered a marker of acknowledgement of stigmatized status) and also to reduce the ability to have safe sex despite the intention to do so. Diversity of sexual behavior (Figure 2) also appears to be restricted by IH, with lower sexual repertoire, possibly because of interactions limited by time, locale or anonymity.

Condom use and IH

Condom use for anal intercourse~~,~~ (controlling for number of non-steady sexual partners for anal sex, and the Pperceived Ceontrol over Ssexual Rrisk-Ttaking)~~,~~ revealed a relationship of lower IH with increasing condom use (Figure 2). This suggests that IH is associated with risky sexual behavior generally and condom use specifically ~~(Figure 4)~~. This unexpected implication of degree of control over sexual risk taking bore further investigation. Table 4 examines the stepwise predictors of Perceived Control over Sexual Risk-Taking and implicates structural variables (Gini coefficient, LGB legal climate), IH and age, plus the existence of social networks and being "out". How these variables amalgamate into lack of control over safe sex may involve fear, lack of access to condoms, surreptitious or no safety negotiations, lack of good preventive information, or need for rapid or anonymous sex, among other factors. Perceived Control over Safe Sex may have similarities to self-efficacy, and relationships between condom self-efficacy and structural discrimination and its internalization warrants further investigation.

Paths between structural variables, IH and HIV Risks

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These data indicate relationships between level of legal and experienced discrimination and IH, and in turn between IH and both outness and gay peer contact, and HIV risk behaviors. HIV risk behaviors associated with high IH include lower levels of HIV testing (not knowing HIV status and/or receiving treatment being a risk), lower levels of ~~v~~perceived control over ~~olitional~~ safe sex, and with lower levels of condom use for anal sex when this safe sex volition and partner numbers are controlled for. The relationship of the Gini coefficient and IH is interesting and here the Gini coefficient probably represents a level of attitude to equality beyond the purely economic (Figure 2) and is consistent with the association found between sexuality-related attitudes and human development indices (15,16, 23) in previous pan-European research.

Consistency with previous data

These findings on IH are consistent with previous data of Shoptaw et al. (9) on IH, albeit using a different IH measure, in African American MSM in Los Angeles, including their finding that IH is associated with lower HIV testing and education levels. It is also consistent with the pathways that Ross et al. (10) described in HIV seropositive U.S. MSM, where IH is associated with risk behavior through less openness, ~~and~~ discomfort with discussion of sexuality, not discussing HIV status, and lower condom use. The finding that there is a higher level of risk behavior (non-use of condoms with casual partners) is also consistent with the data of Ryan (11) in relation to the impact of family homonegativity in adolescents, and Sandfort on the impact of school psychological environment on mental health of Dutch LGB adolescents (24).

Impact of homophobic climate and IH and potential intervention levels

These data suggest, however, that IH may have pervasive effects on sexual behavior related to HIV prevention through the association of a homonegative legal and social climate with higher levels of risk and lower levels of preventive behaviors, at both personal and probably policy levels, although more research is required to elucidate these. Hatzenbuehler et al. (254) note that state-level protective policies modify the effect of sexual orientation on mental health disorders, and it is logical that one of the mechanisms for this may be through reduction of institutional discrimination, hate crimes, homonegativity and providing interventions to reduce internalized homonegativity. ~~No study in Europe has previously looked at HIV-preventive behavior and homonegativity.~~

The public health implications of these data are four-fold. First, it is clear that interventions must incorporate changes in the legal and policy climate (and perhaps religious climate) with regard to MSM. Second, such climate changes need to be communicated to professionals (including health care workers) who are at the government or professional interface with MSM clients, possibly with appropriate in-service training. Third, structural interventions should translate into the provision of specific services or outreach to MSM. Fourth, anti-IH measures for MSM might include individual-level opportunities on the Internet anonymously targeting stigmatized sexual minorities. These could be based on short, easily read informational modules, reduction of pathological stereotypes through pride-enhancing modules, role-model

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stories, and approaches to respond to the negative "voice within" or distancing strategies. The success of this study in reaching some 180,000 MSM via the Internet in three months, in 25 languages, in this study indicates the potential of this medium.

As far as we are aware, no study in Europe has previously looked at HIV-preventive behavior and homonegativity. From these pan-European data, homonegative stigma can be clearly linked through IH to increased HIV risk in MSM at both population and personal levels. Discrimination is bad law, bad policy, bad psychology and bad medicine: reducing homonegative policy and interactions at legal and social levels will have positive health as well as human rights impacts on MSM populations.

Acknowledgements: The EMIS Network thanks the more than 180,000 men who responded to the survey, the more than 235 websites who placed our banner, and particularly those who sent individual messages to their users: PlanetRomeo, Gaydar, Manhunt, Qruiser, and Qguys. We also thank all NGOs who promoted our survey. Without this help, EMIS's success would not have been possible.

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Table 1: Demographic characteristics of MSM with Internalized Homonegativity scores

Top level domain	Country	*n* with IH score[1]	Median age	% Live in City > 500,000	% Tertiary education	% Employed[2]	% now in relationship with a man
at	Austria	3046	30	47.6	31.6	71.7	40.3
ba	Bosnia & Herzegovina	103	28	15.3	53.9	57.8	22.5
be	Belgium	3075	33	44.3	67.4	72.0	46.0
bg	Bulgaria	767	27	66.3	59.9	67.9	35.6
by	Belarus	296	27	63.5	68.9	79.7	53.4
ch	Switzerland	3819	36	13.3	47.8	80.0	43.4
cy	Cyprus	209	30	3.0	64.4	74.2	28.7
cz	Czech Republic	1809	27	46.6	42.9	65.3	50.1
de	Germany	39799	33	42.0	33.3	73.3	42.7
dk	Denmark	1254	33	52.5	50.4	67.6	35.6
ee	Estonia	469	30	9.2	48.4	72.7	40.0
es	Spain	9690	31	51.2	59.5	65.4	31.6
fi	Finland	1642	33	39.0	51.2	68.9	43.7
fr	France	8837	34	52.4	74.7	68.6	47.5
gr	.Greece	2214	30	70.5	65.9	69.3	35.4
hr	Croatia	410	29	54.3	64.5	62.9	36.8
hu	Hungary	1502	28	67.1	69.3	70.2	44.7
ie	Ireland (Republic)	1701	31	50.1	70.9	70.3	29.0
it	Italy	11905	33	35.6	43.9	68.8	37.2
lt	Lithuania	423	27	47.7	73.8	72.1	47.5
lu	Luxembourg	209	34	3.4	54.3	75.4	40.4
lv	Latvia	540	30	62.4	49.7	79.6	46.1
md	Moldova	87	24	62.8	59.8	64.4	49.4
mk	Macedonia	86	28	62.8	82.6	69.8	27.9
mt	Malta	95	33	1.1	61.1	85.3	39.4
nl	Netherlands	2903	39	42.2	62.4	76.9	45.4
no	Norway	1555	30	42.2	64.7	68.1	33.9
pl	Poland	1631	28	64.3	75.5	67.1	45.8
pt	Portugal	3858	30	43.5	60.1	69.5	39.0
ro	Romania	1593	27	46.7	58.3	67.4	38.5
rs	Serbia	822	28	54.6	56.6	54.9	33.6
ru	Russia	4041	30	79.2	73.5	83.7	52.7
se	Sweden	2215	35	54.8	55.6	73.5	40.5
si	Slovenia	673	30	1.8	47.5	64.3	39.5
sk	Slovakia	422	26	26.7	49.6	62.5	44.1
tr	Turkey	1312	28	87.7	85.0	65.3	34.5
ua	Ukraine	1332	29	70.7	76.0	83.2	50.9
uk	United Kingdom	13851	36	51.0	64.7	75.2	36.0

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[1]83.2% overall have IH scores

[2]Excludes students and unemployed

[3] 0-6 scale

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Table 2: Univariable analysis: predictors of ever testing for HIV

Variable	Untested	Ever tested for HIV	Statistic*
Cramer's Φ			
	%	%	
Being "out" to family/friends/colleagues (=Outness)			
All or almost all	16.2	83.8	
More than half	24.1	75.9	
Less than half	29.7	70.3	
Few	39.4	60.6	
None	57.3	42.7	0.28
Proportion of male friends attracted to men			
Almost all	14.8	85.2	
More than half	16.3	83.7	
Approximately half	20.2	79.8	
Less than half	28.5	71.5	
Almost none of them	44.6	55.4	
Have no male friends	45.6	54.4	0.26
Education (6 levels of ISCED**)			
No secondary qualification	38.5	61.5	
Some high school/trade qualification	34.2	65.8	
Lower secondary education	30.1	69.9	
Upper secondary education	33.2	66.8	
Higher education below degree level	24.4	75.6	
University degree completed	19.1	80.9	0.13
Size of settlement			
Very big city or town (1 million or more)	19.4	80.6	
Big city or town (½ to 1 million)	23.1	76.9	
Medium city (100,000 to ½ million)	28.5	71.5	
Small city (10,000 to 100,000)	35.0	65.0	
Village or rural area (<10,000)	36.7	63.3	0.15
	mean±SD		Cohen's *d*
Internalized Homonegativity	1.85±1.31	1.37±1.18	0.40

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Age	30.43±11.56	35.56±10.60	0.47

*Given sample size of 144,177 significance is not shown (144,177 cases with IH score are 82.8% of eligible cases with consistent data).

** The 6 levels of the International Standardised Classification of Educational Degrees.

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Table 3: Path analysis of Internalized Homonegativity and HIV-related risk behaviors

	β*	B	95% CI of B
Analysis 1			
Step 1: Structural variables predicting Internalized Homonegativity			
LGB legal climate (country level)	-.14	-.16	-.14 - -.13
Gini Coefficient (country level)	.09	.03	2.41 - 2.73
Size of settlement (individual level)	.08	.07	.06 - .07
Step 2: Individual demographic and behavioral variables predicting Internalized Homonegativity			
"Outness"	-.51	-.30	-.30 - -.31
Age (per year)	-.08	-.01	-.01 - -.01
Step 3: IH, social and demographic variables predicting having HIV test			
Internalized Homonegativity (per 1)	-.01	-.01	-.01 - -.01
"Outness"	-.21	-.07	-.07 - -.06
Proportion of gay friends	-.14	-.04	-.04 - -.04
Education	.10	.04	.04 - .03
Age (per year)	.17	.01	.01 - .01
Analysis 2			
Internalized Homonegativity as predictor of sexual variables			
Perceived control over sexual risk-taking (Y/N)	-.15	-.18	-.17 - -.19
Sexual diversity	-.01	-.01	0.01 – 1.01
Ever had an HIV test (Y/N)	-.13	-.40	-.38 - -.42
Relative frequency, condom use, non-steady partners past year	.03	.03	.03 - .03

* Which form path coefficients in Figure 3.

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Table 4: Stepwise predictors of Perceived Control over Sexual Risk Taking.

	β	B	95% CI of B
Number of non-steady partners in past 12 months	-.21	-.07	-.07 - -.06
Internalized Homonegativity	-.12	-.10	-.10 - -.09
GINI Coefficient	-.11	-.03	-.03 - -.03
LGB Legal climate	.03	.02	.01 - .03
Age	.03	.02	.02 - .03
Education	.02	.01	.01 - .02
Outness	-.02	-.02	-.02 - -.01
Proportion of gay friends	.01	.01	.01 - .02

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Figure 1~~1~~:

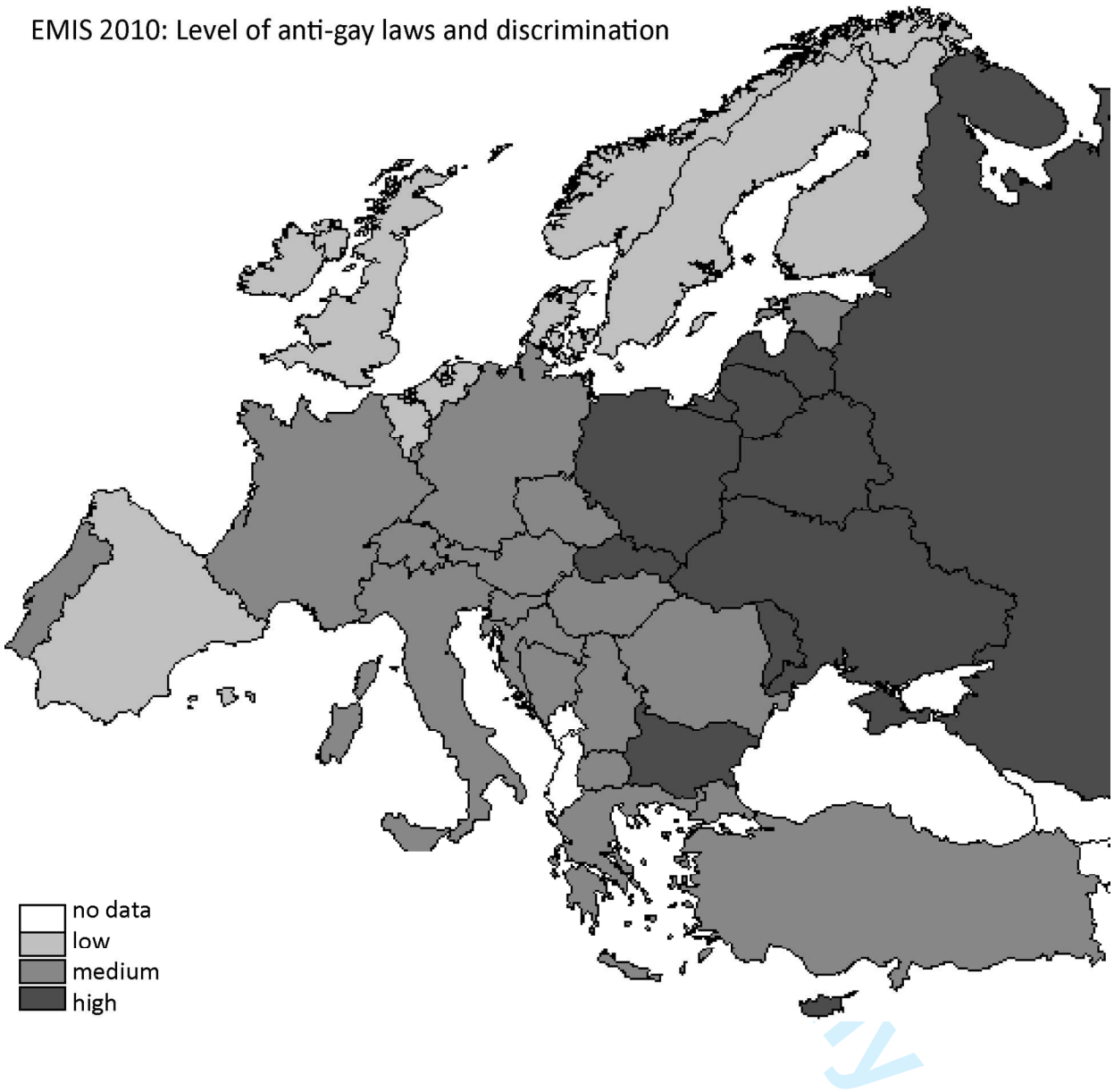

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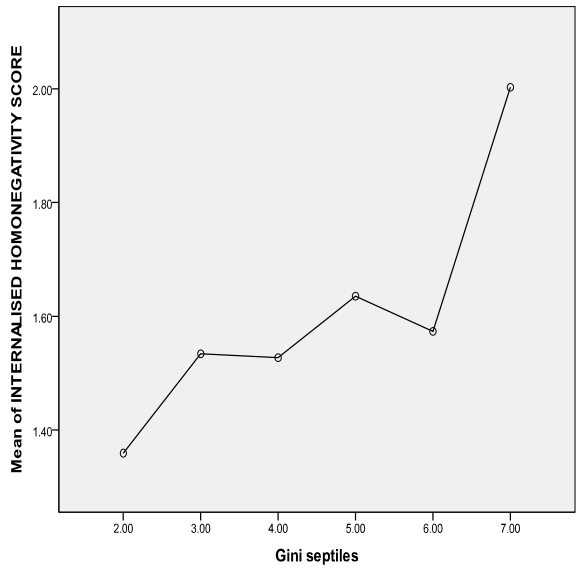
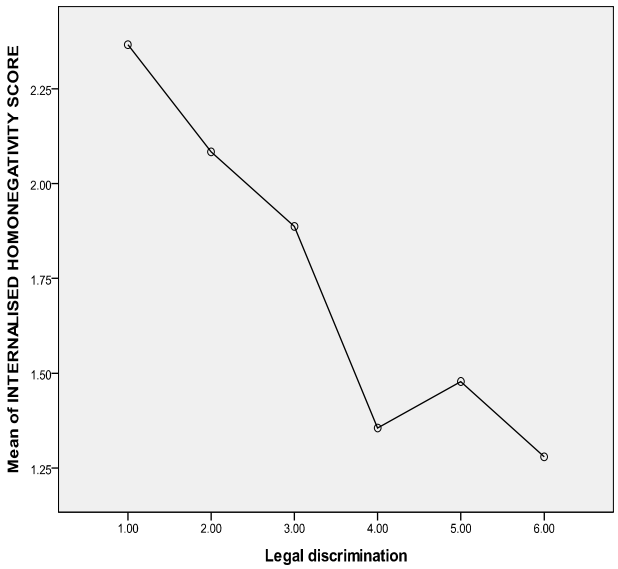
Figure 22: Relationship of Internalized Homonegativity to Social and Behavioral Variables

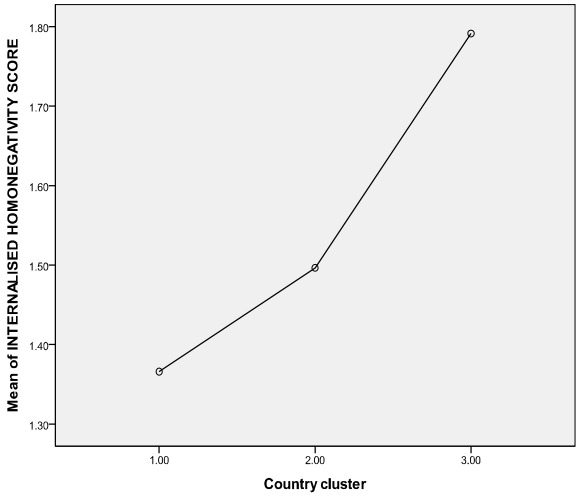
Relationship of Internalized Homonegativity to Gini Coefficient sextiles



Relationship of Internalized Homonegativity to Gay Legal Discrimination Index



Relationship between IH and Country Cluster



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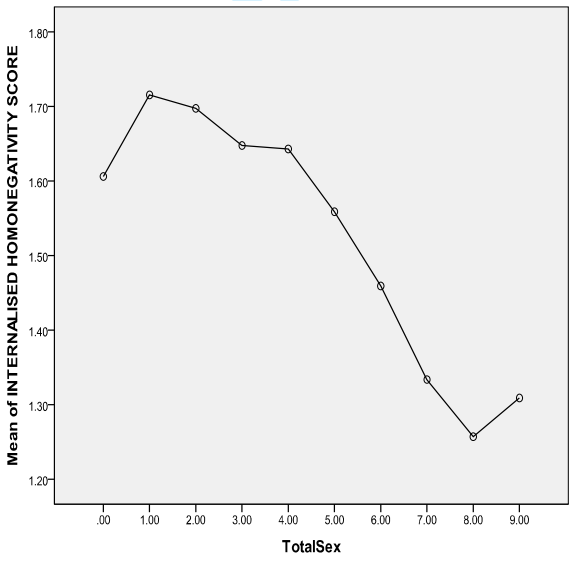
Relationship of Internalized Homonegativity to Sexual Ddiversity Score



Internalized Homonegativity score by Condom use for Anal intercourse with Non-steady Partners in past 12 months

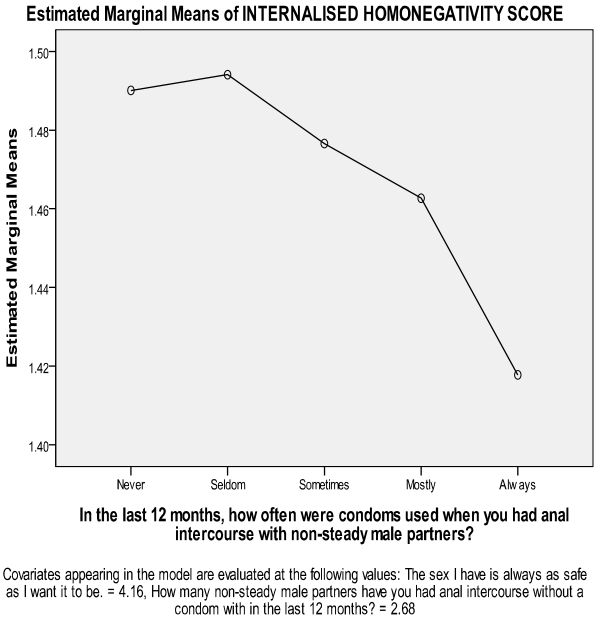


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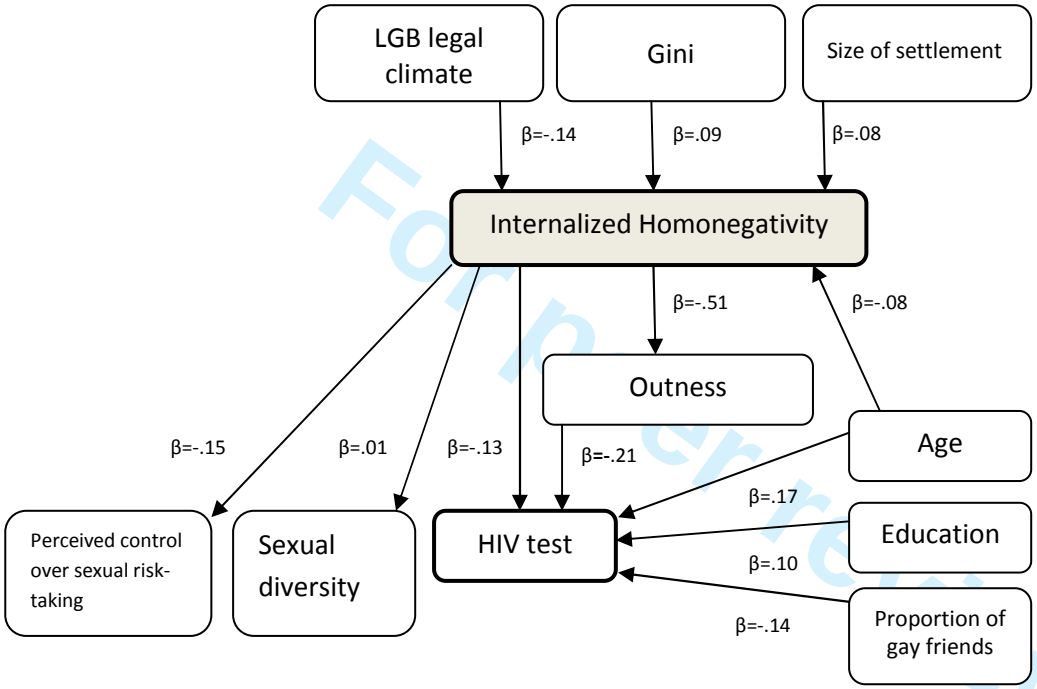
Figure 3: Paths Associated with Internalized Homonegativity



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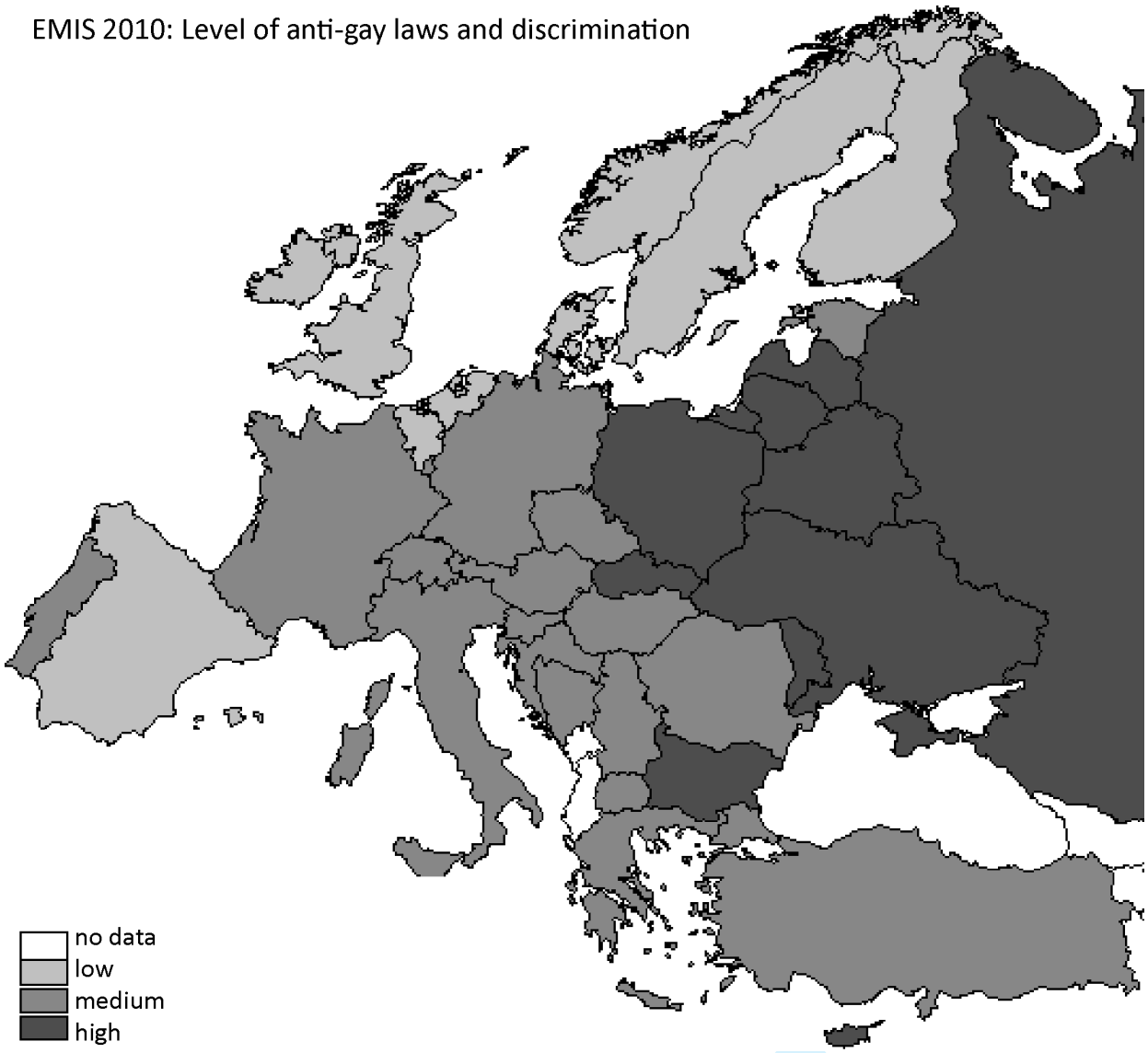

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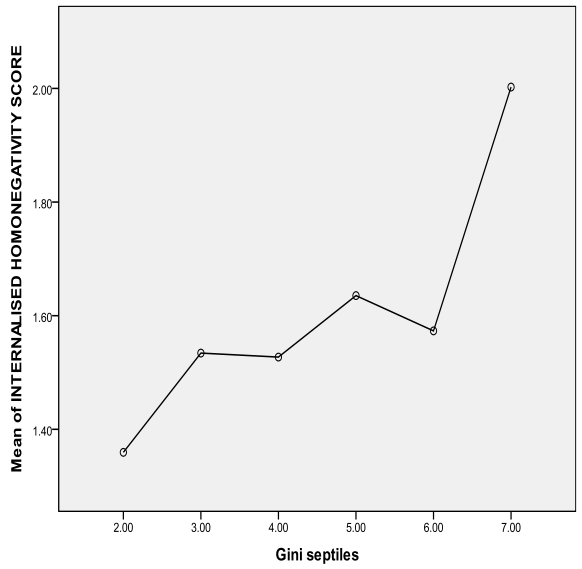

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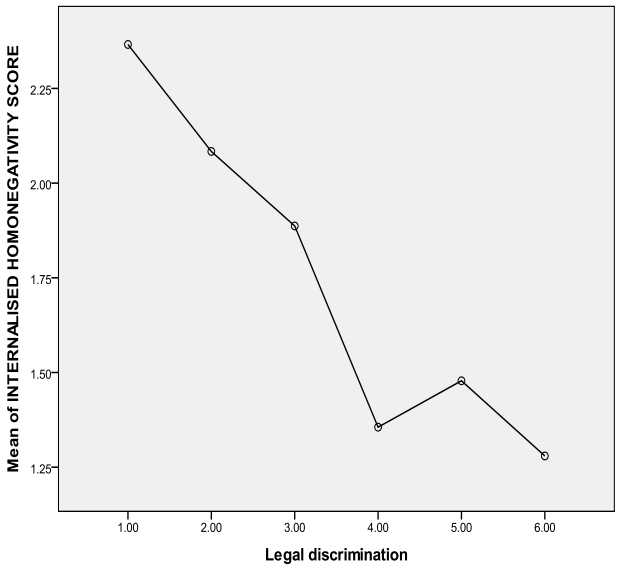

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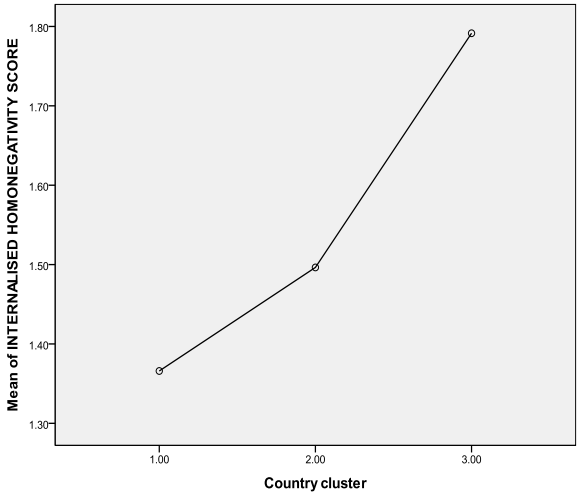

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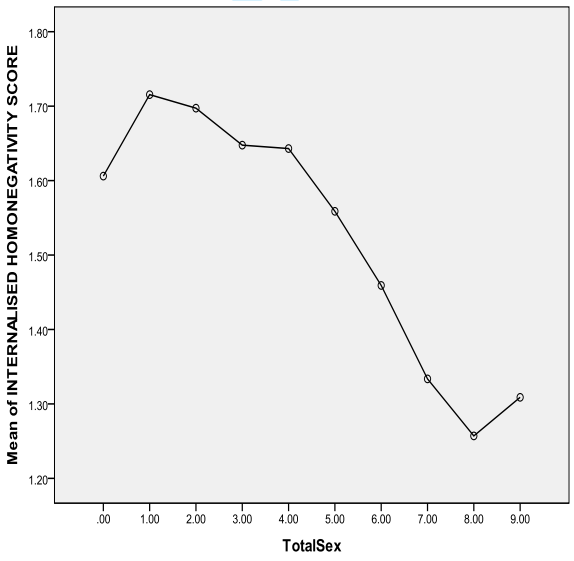
Relationship of Internalized Homonegativity to Sexual Diversity Score



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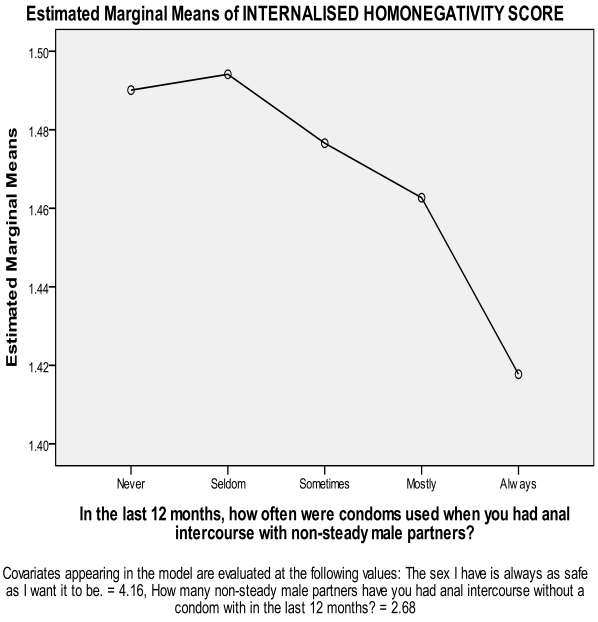

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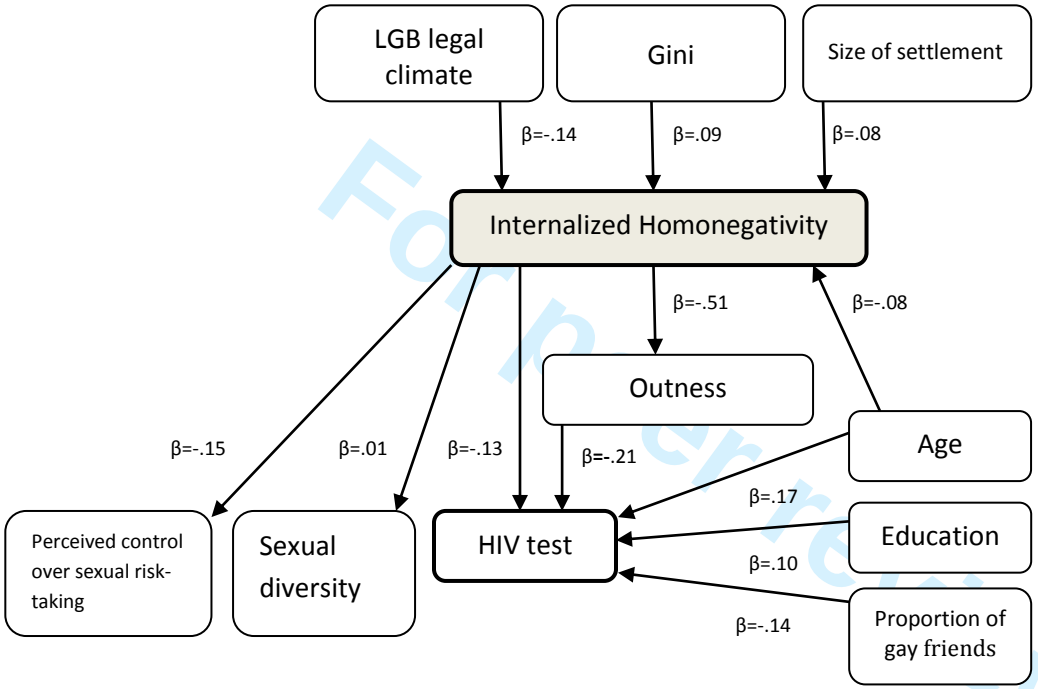
Figure 3: Paths Associated with Internalized Homonegativity



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Internalised Homonegativity predicts HIV-Associated Risk Behavior in European Men who have Sex with Men in a 38-country cross-sectional study: Some Public Health Implications of Homophobia

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(Draft 11, November 2 2012)

Internalised Homonegativity predicts HIV-Associated Risk Behavior in European Men who have Sex with Men in a 38-Country Cross-sectional Study: Some Public Health Implications of Homophobia

Michael W. Ross[1], Rigmor C. Berg[2], Axel J. Schmidt[3], Harm. J. Hospers[4], Michele Breviglieri[5], Martina Furegato[5] Peter Weatherburn[3] and
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Abstract

Objectives: Internalised Homonegativity (IH) is hypothesised to be associated with HIV risk behavior and HIV testing in men who have sex with men (MSM). We sought to determine the social and individual variables associated with IH and the associations between IH and HIV-related behaviours.
Design and setting: We examined IH and its predictors as part of a larger Internet-delivered, cross-sectional study on HIV and health in MSM in 38 European countries.
Participants: 181,495 MSM, IH data analysis subsample 144,177. All participants were male, over the age of consent for homosexual activity in their country of domicile, and have had at least one homosexual contact in the past 6 months.
Methodology: An anonymous Internet-based questionnaire was disseminated in 25 languages through MSM social media, websites and organizations and responses saved to a UK-based server. IH was measured using a standardized cross-culturally appropriate scale.
Results: Three clusters of European countries based on level of experienced discrimination emerged. IH was predicted by country LGB legal climate, Gini coefficient, and size of place of settlement. Lower IH was associated with degree the respondent was "out" as gay to others, and older age. "Outness" was associated with ever having an HIV test and age, education and number of gay friends, while IH (controlling for number of non-steady unprotected sex partners and perceived lack of control over safe sex) was associated with condom use for anal intercourse.

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Conclusions: IH is associated with LGB legal climate, economic development indices, and urbanization. It is also associated with "outness" and with HIV risk and preventive behaviors including HIV testing, perceived control over sexual risk, and condom use. Homonegative climate is associated with IH and higher levels of HIV-associated risk in MSM. Reducing IH through attention to LGB human rights may be appropriate HIV reduction intervention for MSM.

Article Focus:

- Internalized Homonegativity (IH) has been implicated as a variable associated with HIV risk behaviours.
- We examined the paths associated with IH in a study of over 140,000 MSM in 38 European countries
- We established several social structural variables acting through IH to influence HIV testing and condom use

Key Messages:

- Gay legal discrimination, size of place of residence and Gini coefficient of economic inequality were macro or country-level variables that influenced IH
- IH in turn influenced being "out" and through that HIV testing
- Perceived control over safe sex and condom use were predicted by IH and the country-level variables

Strengths and Weaknesses:

- The study had a large *n* and with 38 countries, we were able to demonstrate that countries clustered onto a single discrimination continuum
- We demonstrate linkages between macro-level (country), meso level (community) and micro (individual level) variables including HIV-associated risk behaviour
- Effect sizes were sometimes small and of theoretical rather than practical importance

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Introduction

Disease has classically been associated with disadvantage, with lower socioeconomic and occupational status being associated with chronic disease (1). Infectious disease has also been disproportionately associated with disadvantage, along with access to health services (expressed by Hart's inverse care law that those who are most in need of health care have the lowest access to it (2)). These patterns of disadvantage extend to targets of discrimination, including women and racial and ethnic minorities (3). More recently, structural inequalities such as income distribution have been implicated in poor health outcomes and access (4).

Discrimination is largely based on obvious stigmatizing characteristics such as race or appearance (5) and little attention has been paid to less visible or invisible stigmatizing statuses, such as homosexuality and homosexual behavior. As Ross (6) found, there is no close link between *experienced* discriminatory acts and *expectation* of discrimination, because those homosexual men who anticipate the worst outcomes remain the most hidden, and thus less likely to *experience* discrimination. Poor mental health has been hypothesized (7) to result from internalization of negative attitudes and assumptions about homosexual people, commonly described as "homophobia". Internalized Homonegativity (IH), internalization of negative attitudes and assumptions about homosexual people by homosexuals themselves, leads to feelings of guilt, inferiority and lack of self-worth. Meyer (7) summarizes the evidence and places IH into the conceptual framework of minority stress, in which prejudice, stigma, and discrimination create a hostile and stressful social environment that may cause mental health problems.

Recent data indicate that IH is directly associated with mental health outcomes (8), with avoidance of HIV testing and identification as bisexual or straight in men who have sex with men (MSM) (but not HIV risk behaviors when sexual identification and race/ethnicity were controlled for) (9), and indirectly through the mediators of discomfort with discussing HIV status and condom use (10). Ryan et al. (11) found that family rejection of gay and lesbian adolescents was associated with an 8.4 times higher likelihood of attempting suicide, 5.9 times higher likelihood of depression, 3.4 times higher levels of using illegal drugs, and a 3.4 times higher risk of engaging in unprotected intercourse compared with teens who reported no or low levels of family rejection. A recent review of US studies (12) concluded that IH has minimal effect on risk behavior, although that conclusion has been criticized for being based largely on US data and for assuming a linear relationship between the two variables (13). However, Ross et al. (14) have demonstrated that IH predicts sexual risk behavior in gay men in Uganda, where homosexuality is heavily stigmatized. The data suggest that IH may vary significantly from country to country as a function of levels of discrimination at legal and structural levels as well as individual experience: that is, ambient homophobia is a major determinant of IH. European data from over a decade ago indicate that general population homonegativity is negatively associated with religion and immigration, and positively associated with urbanization and

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economic development (15, 16). EMIS is a European study with a unique opportunity to research IH in a range of political and social settings.

The European MSM Internet Survey (EMIS) (17) in 38 European countries is the first pan-European survey of MSM, by European researchers, and provides an opportunity to examine IH and both its structural predictors and its associations with HIV risk behavior in a large and geographically diverse sample, with sufficient countries to enable analysis by country-level (macro) as well as local (meso) and individual (micro) level variables. A short form of Ross and Rosser's IH scale has recently been developed with culturally stable items (18, 19) to make this possible. We report on an analysis of IH levels by country structural variables including legal discrimination and income inequality, and levels of experienced discrimination, and in turn its associations with HIV testing and preventive sexual behavior. We hypothesize that IH will be influenced by legal climate regarding LGB (Lesbian, Gay and Bisexual) variables and possibly other structural issues, and that IH will itself be associated with MSM's visibility and social context, and HIV-related prevention behaviors including HIV testing and condom use.

Methods

The methods of the European MSM Internet Survey have been described in detail elsewhere (Weatherburn et al., submitted). In brief, EMIS is a joint project of academic, governmental, and non-governmental partners from 38 countries in Europe (EU and neighbouring countries) to simultaneously run an online survey in 25 different languages during summer 2010. EMIS was designed to inform the planning of prevention interventions for MSM by identifying prevention needs commonly unmet across MSM (priority aims), as well as subgroups of MSM who have many prevention needs poorly met (priority target groups).

Promotion and recruitment

The Internet-based self-completion survey study was promoted online and offline through various media for gay, bisexual, and other men who have sex with men (MSM) under the slogan 'Be part of something huge!' More than 235 local, national, and international Lesbian Gay Bisexual Transgender (LGBT) websites, undertook online recruitment and many of these organizations also promoted the survey offline, via posters, recruitment cards and face-to-face interaction. By visiting a promotion website men were exposed to banner advertisements inviting them to participate in the study. PlanetRomeo, Manhunt, Qruiser, Qguys, and Gaydar sent individual messages to their users inviting them to complete the survey. By clicking on the banner or the study link, potential respondents were directed to a survey "landing page" and asked to choose one of 25 languages for completion. Once they had chosen a language the first page described the study, including its purpose, its voluntary and anonymous nature, and gave contact information on how to contact the researchers.

Men were eligible to participate if they were: living in Europe, at or over the age of homosexual consent in the country they lived in, sexually attracted to men and/or having sex with men. They

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also needed to indicate that they understood the nature and purpose of the study and consent to take part.

The survey was physically located on servers owned and administered by the company Demographix.com, whose staff was responsible for testing it across different computer platforms/operating systems and with different web-browsers, and managing the technical aspects including back-ups and data delivery to the researchers. The data were protected with a 128-bit SSL encryption server, not accessible to the public. We neither collected the IP-address of participants' computers nor installed any cookies on it. The survey was available online between June 4 and August 31, 2010. EMIS could be completed in any of 25 languages, and the questions were identical in each language version. It took 21minutes to complete the survey on average. No study recompense was offered. All study procedures were approved by the Research Ethics Committee of the University of Portsmouth, UK (REC 08/09:21).

Data preparation and analysis

At the close of fieldwork there were 184,469 cases in the consolidated file. Partially completed surveys (moving away from the web page before pressing 'submit') were not captured. When downloaded 3 cases were lost due to data corruption and 2,427 cases were removed from the dataset because they gave no country of residence or a country of residence outside the study area. A further 544 cases were removed on the basis they were women, or men with no homosexual desire or experience, gave no age, or were under 13 or over 89 years old. This left a total of 181,495 cases meeting the qualifying criteria. Data from 291 cases from European countries and states that did not reach 100 qualifying cases were removed as were 6,995 cases with more than one inconsistency, defined as answers to two questions which cannot both be valid. Inconsistent data could be submitted by moving backwards and forwards in the survey and changing previously given answers. It could also be submitted simply by supplying inconsistent answers across one or more questions. Given the length and complexity of the survey, we allowed respondents to have one inconsistency in their given answers; but we excluded all cases with more than one inconsistency, suggesting giving random answers which is to be expected in a low-threshold questionnaire like EMIS. This left an analytic sample of 174,209 MSM from 38 European countries (17).

Measures and Analyses

Measures

IH was scored according to the criteria described by Ross et al. and Smolenski et al. (18,19) as an additive scale of 7 items, ranging from 0 to 6 (Cronbach's $\alpha = 0.70$).

Education was measured using the 6 levels of the International Standardized Classification of Educational Degrees (ISCED) corresponding to the educational system of each country.

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"Outness" – defined as the proportion of people one is out to as gay or bisexual (family, friends, work or study colleagues) – was measured on a 5-point Likert scale from "all or almost all" to "none".

Proportion of male friends who are also attracted to men was measured on a 6-point Likert scale from "almost all of them" to "almost none of them" and "I don't have any male friends".

Having ever had an HIV test was a binary (yes/no). We compared this binary variable with the extended variable of how long ago the respondent had had an HIV test (24 hours, 7 days, 1 month, 6 months, 12 months, 5 years, more than 5 years ago) and found that the two measures correlated 0.88. We thus decided to use the binary measure in analyses, particularly given the non-linear nature of the time measure.

Perceived control over sexual risk-taking was measured on a 5-point Likert scale anchored by "strongly agree" "and strongly disagree" with the statement "The sex I have is always as safe as I want it to be".

Relative frequency of condom use with non-steady partners was measured as "In the last 12 months, how often were condoms used when you had anal intercourse with non-steady male partners?" (6-point Likert scale "all or almost all" to "none").

The number of non-steady anal intercourse (AI) partners was asked as "How many non-steady partners did you have anal intercourse with in the last 12 months? (number).

Sexual diversity of practice: EMIS asked for the recency of a range of sexual practices with non-steady partners. Although this set was originally designed to reflect certain transmission routes for HIV and STIs, it can serve as a proxy for diversity of sexual practices, even if sexual practices with steady partners are not included. Sexual diversity was the sum of the 9 different types of sexual behaviors with non-steady partners reported in the past 6 months (mutual masturbation, oral insertive, oral receptive, anal insertive, anal receptive, rimming, being rimmed, and insertive and receptive "fist-fucking". These were recoded as binaries to reflect engaging in them or not in the past 6 months and summed to form a measure of the relative diversity of the respondents' sexual repertoires (Cronbach's $\alpha = 0.77$).

Size of settlement was measured on a 5-point scale from a "a very big city or town (a million or more people)", to "a village /the countryside (less than 10,000 people)".

Legal climate was measured by scoring the presence of the 6 legislative measures of LGB status (legal discrimination) listed by Wikipedia (20) in with a high score of 6 for presence of all legislative protections (homosexual acts are legal, recognition of same-sex relationships, same sex marriage, same-sex adoption, gays serve in the military, LGB antidiscrimination laws).

The Gini coefficient of income inequality in a country was extracted from the UN Human Development Report coefficient for all countries (2008) with the exceptions of Cyprus, Malta, Luxembourg and Serbia, which were derived from an identical calculation method using the CIA Gini score (2008). The Gini coefficient ranges from 0 (all people in a country have equal income) to 1.0 (one person has all the income). It serves as a general economic measure of distribution of wealth.

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Analyses Analyses, unless otherwise indicated, were carried out using SPSS versions 19 and 20, on the 38 country dataset (Table 1). Cluster analysis of the 38 countries was carried out using SPSS 19: a two-step procedure using Euclidian distances was employed, entering three variables: country LGB legal discrimination scores, proportion of MSM reporting verbal abuse, and proportion of MSM reporting physical violence because someone knew or presumed they were attracted to men. Three country clusters emerged including 9, 17, and, respectively, 12 countries, with good fit (Silhouette coefficient of cohesion and separation = 0.65; Figure 1).

Bivariate analyses were carried out using χ^2 with Cramer's Φ as measure of effect size for ordinal data, and *t*-test (using Cohen's D as measure of effect size)(Table 2). Effect size statistic for univariable ANOVA for interval or ratio level data was η^2. Because of the large size of the sub-sample with valid IH scores (N=144,177), almost all analyses were highly statistically significant so *p* levels are not reported. Means of IH were graphed against selected structural and behavioral variables in Figure 1 to illustrate the relationship between variables. Regression analysis in Table 3 was carried out by linear regression for interval- or ratio-level dependent variables using simultaneous entry in hierarchical blocks of individual demographic variables, individual behavioral variables, plus external source country level variables. Path coefficients calculations appear in Table 3 and in Figure 3 are reflected by β from the linear regressions in Table 3, with path arrows indicate direction of temporal relationship (e.g., IH cannot affect age so the relationship has to be in the opposite direction), or predicted relationship in the model. Stepwise linear regression was carried out for variables predicting Perceived Control over Sexual Risk-Taking in Table 4 to allow variables to enter in a forward hierarchical model.

Results.

Basic demographic data are presented in Table 1 from participants with valid IH data. These data from 38 countries illustrate the *n*s for each country (ranging from 86 in Macedonia to over 39,000 in Germany), median age (ranging from 24 in Moldova to 36 in Switzerland and the UK), % living in a city >500,000 population (ranging from 3% in Malta to 87.7% in Turkey), % with tertiary education (ranging from 31.6% in Austria to 85.0% in Turkey), % employed (ranging from 54.9% in Romania to 85.3% in Malta), and % now in a relationship with another man (ranging from 22.5% in Bosnia-Herzegovina to 53.4% in Belarus to 53.4% in Belarus). IH scores ranged from 1.22 in The Netherlands and 1.23 in Sweden, to 2.57 in Bulgaria and 2.54 in Bosnia-Herzegovina.

Data from the 38 countries clustered into three groups using (a) measures of legal climate supporting LGB rights, (b) proportion experiencing verbal discrimination, and (c) physical violence because of assumed homosexuality. The three clusters of countries (Figure 1) characterized a group of "liberal" Scandinavian countries (Denmark, Finland, Norway, Sweden) Western (Belgium, , Ireland, The Netherlands, United Kingdom, Spain) European countries; a group of "moderate" Central and Mediterranean countries (France, Portugal, Germany, Czech

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Republic, Switzerland, Italy, Austria, Slovenia, Hungary, Croatia, Bosnia-Herzegovina, Romania, Macedonia, Greece, Turkey, Estonia); and a group of "conservative" Southeastern, Northeastern, and Eastern European countries (Poland, Slovakia, Belarus, Lithuania, Latvia, Russia, Ukraine, Moldova, Bulgaria, Cyprus), countries characterized by the highest levels of discrimination (note that IH was not part of the equation for this clustering process). Clustering countries on the basis of legal and self-reported personal discrimination against MSM provided both a potential validation of the measure of IH, and a means of conceptualizing geographic sub-sets of levels of discrimination (Figure 2). IH was closely related to the three discrimination-based clusters, with highest IH in the "conservative" countries and lowest IH in the "liberal" cluster of countries.

Using the measures of LGB legal climate (the strongest predictor), Gini coefficient, and size of place of residence all predicted IH (Table 3, Figures 2 and 3). IH, in turn was associated with outness and age. The HIV-associated behavior most closely associated with IH were (a) ever being tested for HIV (mediated by outness), and (b) a perception of having no control over sexual risk-taking. Sexual diversity had a smaller impact. HIV testing was predicted, following outness as the major component, by the proportion of gay friends, highest educational attainment, and age.

A second linear regression limited to the demographics, HIV testing, "outness" and perceived control over sexual risk-taking onto IH indicated that those most closely associated with IH were lack of control over sexual risk-taking, and not being tested for HIV.

Bivariate relationships between IH and country cluster, Gini coefficient septiles, LGB legal climate (Figure 2) show a relationship between these variables and IH. Sexual diversity illustrates (Figure 2) an increase in sexual diversity with decreasing IH and a more limited range of sexual activity with higher IH.

Table 2 illustrates the bivariate associations with strong effect sizes predicting ever having had an HIV test, specifically being "out" and proportion of MSM friends, followed by education and size of settlement.

Analysis of variance of IH score by relative frequency of condom use with non-steady partners, with covariates the number of non-steady partners that they had unprotected anal intercourse with in the past year and Perceived Control over Sexual Risk-Taking, demonstrated a small to moderate effect size (η^2=.03). An accelerating relationship between IH and relative frequency of condom use (covariates perceived control over sexual risk, and number of casual partners in the past year) with non-steady male partners was apparent (Figure 2). The strong relationship of Perceived Control over Sexual Risk-Taking in Figure 2 with condom use lead to an additional analysis of the predictors of this Perceived Control (Table 4). The highest stepwise predictors were number of non-steady partners one had anal intercourse with in the past 12 months; IH; GINI coefficient; and LGB legal climate.

Discussion

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While these data represent 144,177 MSM in 38 countries, their collection via Internet constitutes a non-random sample. Previous Swedish data comparing Internet sexual data collection with questionnaire data from a large national random sample from a sexuality study in the same country (21, 22) indicate that general Internet samples tend to be somewhat younger, more likely to be single, better educated and urban. Internet samples of MSM may be more bisexually-identified, worse educated and rural compared with traditional *gay venue questionnaire-based* samples in Sweden. The Swedish data indicate the known biases for Internet samples by comparing them with a national "gold standard" study. The EMIS data, are likely to be biased toward those who are better educated and Internet-literate, and probably more familiar with the gay subculture. This sampling biaswill be more substantial in Eastern European countries where household Internet access is less common and smaller proportions of the whole MSM population participated in EMIS. On the other hand, the Law of Large Numbers would suggest that for the larger country samples, range is adequately represented. The three clusters which emerged of countries based on anti-gay discrimination are consistent with clusters of countries reported by Lottes and Akula (23) on self-expressed sexual values, including justification of homosexuality, in a pan-European sample. For groups who are discriminated against and highly stigmatized, there is no good alternative to Internet data collection for a study of this size. However, Internet biases are, from previous studies on sexuality, known and quantifiable.

Structural variable relationships of IH

These data demonstrate the possible paths connecting anti-gay discrimination at legal and demographic levels with IH, along with size of place of residence. The relationship is clear despite relatively low variance in the tripartite cluster-based classification of country by legal and experienced discrimination level. Levels of IH are closely and linearly related to the "liberal", "moderate" and "conservative" clusters, providing criterion validity linking levels of discrimination and IH. IH in turn is closely associated with younger age, social measures of being "out" and connected with gay peers, which in turn are associated with HIV test-taking (Figure 3). While the effect size of a $\beta < .1$ is minor, generally, the greater the distance of a structural variable from an individual, the more difficult it is to achieve a large effect size. Paths from social climate variables to IH and behavior are measurable and quantifiable, given that this study has power to detect theoretically important differences from the "background radiation" of structural and social climate factors at a country level. While at the individual data level the study appears overpowered, at the country variable level the n is only 38. Figure 2 indicates graphically the relationships between IH and both structural and behavioral variables.

HIV testing and IH

Higher IH is also associated with decreased levels of ever HIV test-taking as mediated by "outness" (but not directly), and denying that their sexual conduct is always as safe as the respondents want it to be (Perceived Control over Sexual Risk-Taking). Thus, higher IH appears to both discourage HIV testing (which may be considered a marker of acknowledgement of stigmatized status) and also to reduce the ability to have safe sex despite the intention to do so.

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Diversity of sexual behavior (Figure 2) also appears to be restricted by IH, with lower sexual repertoire, possibly because of interactions limited by time, locale or anonymity.

Condom use and IH

Condom use for anal intercourse (controlling for number of non-steady sexual partners for anal sex, and the Perceived Control over Sexual Risk-Taking) revealed a relationship of lower IH with increasing condom use (Figure 2). This suggests that IH is associated with risky sexual behavior generally and condom use specifically . This unexpected implication of degree of control over sexual risk taking bore further investigation. Table 4 examines the stepwise predictors of Perceived Control over Sexual Risk-Taking and implicates structural variables (Gini coefficient, LGB legal climate), IH and age, plus the existence of social networks and being "out". How these variables amalgamate into lack of control over safe sex may involve fear, lack of access to condoms, surreptitious or no safety negotiations, lack of good preventive information, or need for rapid or anonymous sex, among other factors. Perceived Control over Safe Sex may have similarities to self-efficacy, and relationships between condom self-efficacy and structural discrimination and its internalization warrants further investigation.

Paths between structural variables, IH and HIV Risks

These data indicate relationships between level of legal and experienced discrimination and IH, and in turn between IH and both outness and gay peer contact, and HIV risk behaviors. HIV risk behaviors associated with high IH include lower levels of HIV testing (not knowing HIV status and/or receiving treatment being a risk), lower levels of perceived control over safe sex, and with lower levels of condom use for anal sex when this safe sex volition and partner numbers are controlled for. The relationship of the Gini coefficient and IH is interesting and here the Gini coefficient probably represents a level of attitude to equality beyond the purely economic (Figure 2) and is consistent with the association found between sexuality-related attitudes and human development indices (15,16, 23) in previous pan-European research.

Consistency with previous data

These findings on IH are consistent with previous data of Shoptaw et al. (9) on IH, albeit using a different IH measure, in African American MSM in Los Angeles, including their finding that IH is associated with lower HIV testing and education levels. It is also consistent with the pathways that Ross et al. (10) described in HIV seropositive U.S. MSM, where IH is associated with risk behavior through less openness, discomfort with discussion of sexuality, not discussing HIV status, and lower condom use. The finding that there is a higher level of risk behavior (non-use of condoms with casual partners) is also consistent with the data of Ryan (11) in relation to the impact of family homonegativity in adolescents, and Sandfort on the impact of school psychological environment on mental health of Dutch LGB adolescents (24).

Impact of homophobic climate and IH and potential intervention levels

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These data suggest, however, that IH may have pervasive effects on sexual behavior related to HIV prevention through the association of a homonegative legal and social climate with higher levels of risk and lower levels of preventive behaviors, at both personal and probably policy levels, although more research is required to elucidate these. Hatzenbuehler et al. (25) note that state-level protective policies modify the effect of sexual orientation on mental health disorders, and it is logical that one of the mechanisms for this may be through reduction of institutional discrimination, hate crimes, homonegativity and providing interventions to reduce internalized homonegativity.

The public health implications of these data are four-fold. First, it is clear that interventions must incorporate changes in the legal and policy climate (and perhaps religious climate) with regard to MSM. Second, such climate changes need to be communicated to professionals (including health care workers) who are at the government or professional interface with MSM clients, possibly with appropriate in-service training. Third, structural interventions should translate into the provision of specific services or outreach to MSM. Fourth, anti-IH measures for MSM might include individual-level opportunities on the Internet anonymously targeting stigmatized sexual minorities. These could be based on short, easily read informational modules, reduction of pathological stereotypes through pride-enhancing modules, role-model stories, and approaches to respond to the negative "voice within" or distancing strategies. The success of this study in reaching some 180,000 MSM via the Internet in three months, in 25 languages, in this study indicates the potential of this medium.

As far as we are aware, no study in Europe has previously looked at HIV-preventive behavior and homonegativity. From these pan-European data, homonegative stigma can be clearly linked through IH to increased HIV risk in MSM at both population and personal levels. Discrimination is bad law, bad policy, bad psychology and bad medicine: reducing homonegative policy and interactions at legal and social levels will have positive health as well as human rights impacts on MSM populations.

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Table 1: Demographic characteristics of MSM with Internalized Homonegativity scores

Top level domain	Country	*n* with IH score[1]	Median age	% Live in City > 500,000	% Tertiary education	% Employed[2]	% now in relationship with a man
at	Austria	3046	30	47.6	31.6	71.7	40.3
ba	Bosnia & Herzegovina	103	28	15.3	53.9	57.8	22.5
be	Belgium	3075	33	44.3	67.4	72.0	46.0
bg	Bulgaria	767	27	66.3	59.9	67.9	35.6
by	Belarus	296	27	63.5	68.9	79.7	53.4
ch	Switzerland	3819	36	13.3	47.8	80.0	43.4
cy	Cyprus	209	30	3.0	64.4	74.2	28.7
cz	Czech Republic	1809	27	46.6	42.9	65.3	50.1
de	Germany	39799	33	42.0	33.3	73.3	42.7
dk	Denmark	1254	33	52.5	50.4	67.6	35.6
ee	Estonia	469	30	9.2	48.4	72.7	40.0
es	Spain	9690	31	51.2	59.5	65.4	31.6
fi	Finland	1642	33	39.0	51.2	68.9	43.7
fr	France	8837	34	52.4	74.7	68.6	47.5
gr	.Greece	2214	30	70.5	65.9	69.3	35.4
hr	Croatia	410	29	54.3	64.5	62.9	36.8
hu	Hungary	1502	28	67.1	69.3	70.2	44.7
ie	Ireland (Republic)	1701	31	50.1	70.9	70.3	29.0
it	Italy	11905	33	35.6	43.9	68.8	37.2
lt	Lithuania	423	27	47.7	73.8	72.1	47.5
lu	Luxembourg	209	34	3.4	54.3	75.4	40.4
lv	Latvia	540	30	62.4	49.7	79.6	46.1
md	Moldova	87	24	62.8	59.8	64.4	49.4
mk	Macedonia	86	28	62.8	82.6	69.8	27.9
mt	Malta	95	33	1.1	61.1	85.3	39.4
nl	Netherlands	2903	39	42.2	62.4	76.9	45.4
no	Norway	1555	30	42.2	64.7	68.1	33.9
pl	Poland	1631	28	64.3	75.5	67.1	45.8
pt	Portugal	3858	30	43.5	60.1	69.5	39.0
ro	Romania	1593	27	46.7	58.3	67.4	38.5
rs	Serbia	822	28	54.6	56.6	54.9	33.6
ru	Russia	4041	30	79.2	73.5	83.7	52.7
se	Sweden	2215	35	54.8	55.6	73.5	40.5
si	Slovenia	673	30	1.8	47.5	64.3	39.5
sk	Slovakia	422	26	26.7	49.6	62.5	44.1
tr	Turkey	1312	28	87.7	85.0	65.3	34.5
ua	Ukraine	1332	29	70.7	76.0	83.2	50.9
uk	United Kingdom	13851	36	51.0	64.7	75.2	36.0

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[1]83.2% overall have IH scores
[2]Excludes students and unemployed
[3] 0-6 scale

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Table 2: Univariable analysis: predictors of ever testing for HIV

Variable	Untested	Ever tested for HIV	Statistic*
Cramer's Φ			
	%	%	
Being "out" to family/friends/colleagues (=Outness)			
All or almost all	16.2	83.8	
More than half	24.1	75.9	
Less than half	29.7	70.3	
Few	39.4	60.6	
None	57.3	42.7	0.28
Proportion of male friends attracted to men			
Almost all	14.8	85.2	
More than half	16.3	83.7	
Approximately half	20.2	79.8	
Less than half	28.5	71.5	
Almost none of them	44.6	55.4	
Have no male friends	45.6	54.4	0.26
Education (6 levels of ISCED**)			
No secondary qualification	38.5	61.5	
Some high school/trade qualification	34.2	65.8	
Lower secondary education	30.1	69.9	
Upper secondary education	33.2	66.8	
Higher education below degree level	24.4	75.6	
University degree completed	19.1	80.9	0.13
Size of settlement			
Very big city or town (1 million or more)	19.4	80.6	
Big city or town (½ to 1 million)	23.1	76.9	
Medium city (100,000 to ½ million)	28.5	71.5	
Small city (10,000 to 100,000)	35.0	65.0	
Village or rural area (<10,000)	36.7	63.3	0.15
	mean±SD		Cohen's *d*
Internalized Homonegativity	1.85±1.31	1.37±1.18	0.40
Age	30.43±11.56	35.56±10.60	0.47

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*Given sample size of 144,177 significance is not shown (144,177 cases with IH score are 82.8% of eligible cases with consistent data).
** The 6 levels of the International Standardised Classification of Educational Degrees.

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Table 3: Path analysis of Internalized Homonegativity and HIV-related risk behaviors

	β*	B	95% CI of B
Analysis 1			
Step 1: Structural variables predicting Internalized Homonegativity			
LGB legal climate (country level)	-.14	-.16	-.14 - -.13
Gini Coefficient (country level)	.09	.03	2.41 - 2.73
Size of settlement (individual level)	.08	.07	.06 - .07
Step 2: Individual demographic and behavioral variables predicting Internalized Homonegativity			
"Outness"	-.51	-.30	-.30 - -.31
Age (per year)	-.08	-.01	-.01 - -.01
Step 3: IH, social and demographic variables predicting having HIV test			
Internalized Homonegativity (per 1)	-.01	-.01	-.01 - -.01
"Outness"	-.21	-.07	-.07 - -.06
Proportion of gay friends	-.14	-.04	-.04 - -.04
Education	.10	.04	.04 - .03
Age (per year)	.17	.01	.01 - .01
Analysis 2			
Internalized Homonegativity as predictor of sexual variables			
Perceived control over sexual risk-taking (Y/N)	-.15	-.18	-.17 - -.19
Sexual diversity	-.01	-.01	0.01 – 1.01
Ever had an HIV test (Y/N)	-.13	-.40	-.38 - -.42
Relative frequency, condom use, non-steady partners past year	.03	.03	.03 - .03

* Which form path coefficients in Figure 3.

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Table 4: Stepwise predictors of Perceived Control over Sexual Risk Taking.

	β	B	95% CI of B
Number of non-steady partners in past 12 months	-.21	-.07	-.07 - -.06
Internalized Homonegativity	-.12	-.10	-.10 - -.09
GINI Coefficient	-.11	-.03	-.03 - -.03
LGB Legal climate	.03	.02	.01 - .03
Age	.03	.02	.02 - .03
Education	.02	.01	.01 - .02
Outness	-.02	-.02	-.02 - -.01
Proportion of gay friends	.01	.01	.01 - .02

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Figure 1:

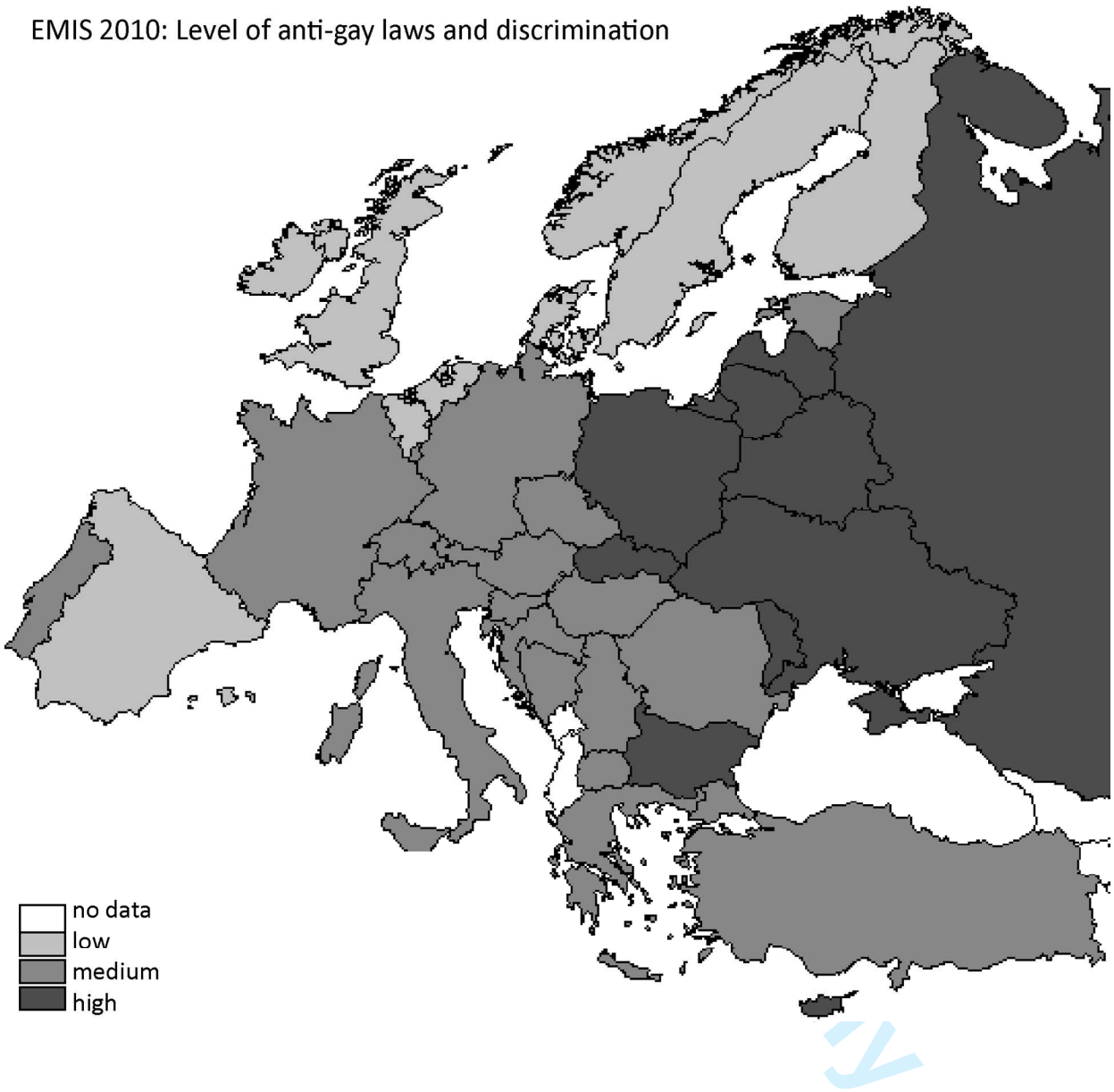

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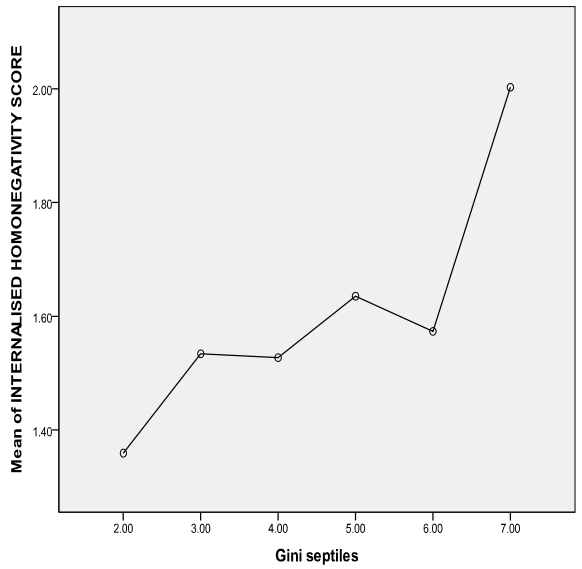
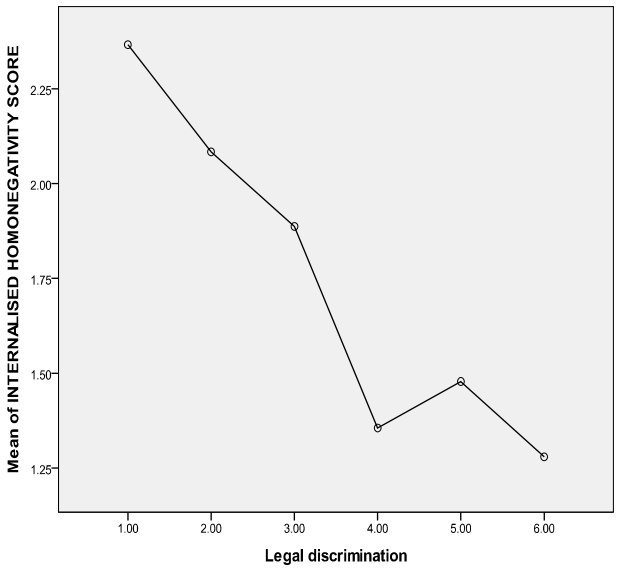
Figure 2: Relationship of Internalized Homonegativity to Social and Behavioral Variables

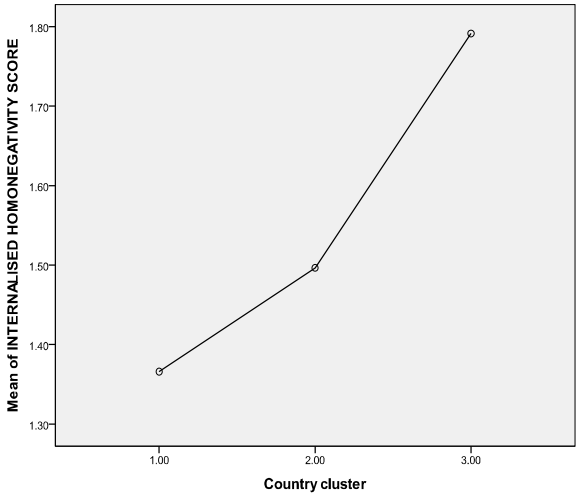
Relationship of Internalized Homonegativity to Gini Coefficient sextiles



Relationship of Internalized Homonegativity to Gay Legal Discrimination Index



Relationship between IH and Country Cluster



1=”liberal”; 2=”moderate”; 3=”conservative”

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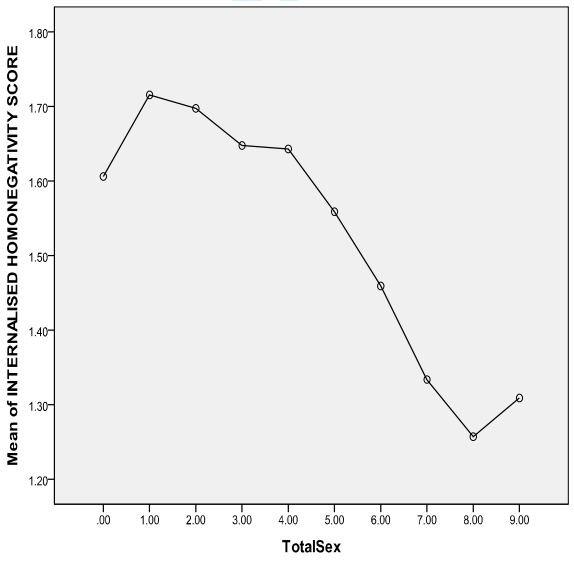
Relationship of Internalized Homonegativity to Sexual Diversity Score



Internalized Homonegativity score by Condom use for Anal intercourse with Non-steady Partners in past 12 months

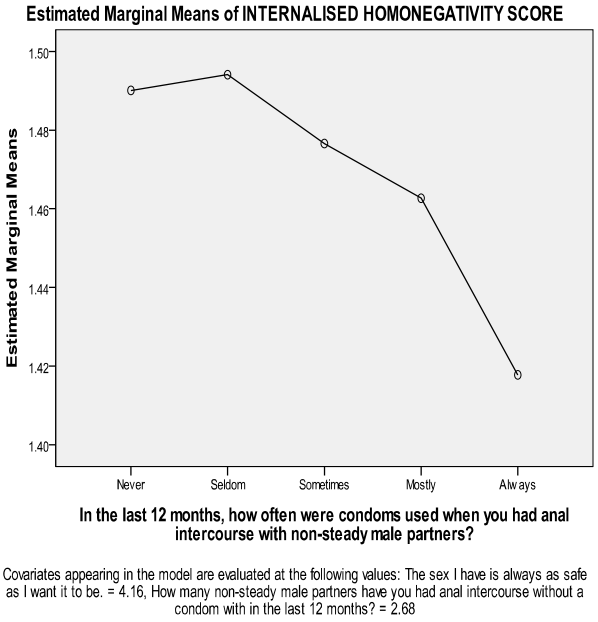


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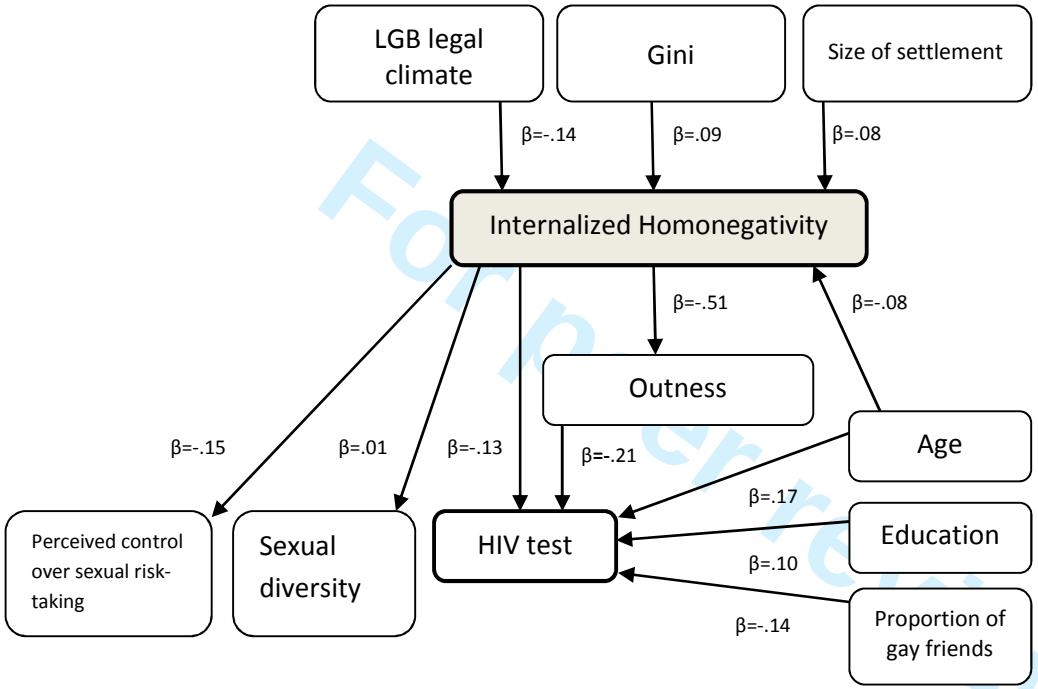
Figure 3: Paths Associated with Internalized Homonegativity



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(Draft 11, November 2 2012)

Internalised Homonegativity predicts HIV-Associated Risk Behavior in European Men who have Sex with Men in a 38-Country Cross-sectional Study: Some Public Health Implications of Homophobia ~~for Gay Men~~

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~~**Acknowledgements:** The EMIS Network thanks the more than 180,000 men who responded to the survey, the more than 235 websites who placed our banner, and particularly those who sent individual messages to their users: PlanetRomeo, Gaydar, Manhunt, Qruiser, and Qguys. We also thank all NGOs who promoted our survey. Without this help, EMIS's success would not have been possible.~~

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~~(3,020 words)~~

Abstract

Objectives: Internalised Homonegativity (IH) is ~~associated with poor mental health in gay, lesbian and bisexual people and is~~ hypothesised to be associated with HIV risk behavior and HIV testing in men who have sex with men (MSM). We sought to determine the social and individual variables associated with IH and the associations between IH and HIV-related behaviours.
Design and setting: We examined IH and its predictors as part of a larger ~~anonymous~~ Internet-delivered, cross-sectional study on HIV and health in MSM in 38 European countries.

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Participants: 181,495 MSM, IH data analysis subsample 144,177. All participants ~~had to be~~ were male, over the age of consent for homosexual activity in their country of domicile, and have had at least one homosexual contact in the past 6 months.
Methodology: An anonymous Internet-based questionnaire was disseminated in 25 languages through MSM social media, websites and organizations ~~in 2010~~ and responses saved to a UK-based server. ~~Questions covered the domains of demographics, HIV risk behavior, testing and treatment, sexual behavior, discrimination, drug use, and sexual attitudes.~~ IH was measured using a standardized cross-culturally appropriate scale. ~~There was no incentive for participation.~~
Results: ~~Cluster analysis indicated 3~~ Three clusters of European countries based on level of experienced discrimination emerged. IH was predicted by country - LGB legal climate, Gini~~INI~~ coefficient, and size of place of settlement. Lower IH ~~in turn~~ was associated with degree the respondent was "out" as gay to others, and older age. "Outness" was ~~strongly~~ associated with ever having an HIV test and age, education and number of gay friends, while IH (controlling for number of non-steady unprotected sex partners and perceived lack of control over safe sex) was associated with ~~perceived control over sexual risk taking and~~ condom use for anal intercourse.
Conclusions: IH is associated with - LGB legal climate, economic development indices, and urbanization. It is also associated with "outness" and with HIV risk and preventive behaviors including HIV testing, perceived control over sexual risk, and condom use. ~~These data confirm that h~~Homonegative climate is associated with IH and higher levels of HIV-associated risk in MSM. Reducing IH through a~~A~~ttention to LGB human rights - may be~~is an~~ appropriate HIV reduction intervention for MSM.

Article Focus:

- Internalized Homonegativity (IH) has been implicated as a variable associated with HIV risk behaviours.
- We examined the paths associated with IH in a study of over 140,000 MSM in 38 European countries
- We established several social structural variables acting through IH to influence HIV testing and condom use

Key Messages:

- Gay legal discrimination, size of place of residence and Gini coefficient of economic inequality were macro or country-level variables that influenced IH
- IH in turn influenced being "out" and through that HIV testing
- Perceived control over safe sex and condom use were predicted by IH and the country-level variables

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Strengths and Weaknesses:

- The study had a large *n* and with 38 countries, we were able to demonstrate that countries clustered onto a single discrimination continuum
- We demonstrate linkages between macro-level (country), meso level (community) and micro (individual level) variables including HIV-associated risk behaviour
- Effect sizes were sometimes small and of theoretical rather than practical importance

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Introduction

Disease has classically been associated with disadvantage, with lower socioeconomic and occupational status being associated with chronic disease (1). Infectious disease has also been disproportionately associated with disadvantage, along with access to health services (expressed by Hart's inverse care law that those who are most in need of health care have the lowest access to it (2)). These patterns of disadvantage extend to targets of discrimination, including women and racial and ethnic minorities (3). More recently, structural inequalities such as income distribution have been implicated in poor health outcomes and access (4).

Discrimination is largely based on obvious stigmatizing characteristics such as race or appearance (5) and little attention has been paid to less visible or invisible stigmatizing statuses, such as homosexuality and homosexual behavior. As Ross (6) found, there is no close link between *experienced* discriminatory acts and *expectation* of discrimination, because those homosexual men who anticipate the worst outcomes remain the most hidden, and thus less likely to *experience* discrimination. Poor mental health has been hypothesized (7) to result from iInternalization of negative attitudes and assumptions about homosexual people, commonly described as "homophobia". Internalized Homonegativity (IH), internalization of negative attitudes and assumptions about homosexual people by homosexuals themselves, leads to feelings of guilt, inferiority and lack of self-worth. Meyer (7) summarizes the evidence and places IH into the conceptual framework of minority stress, in which prejudice, stigma, and discrimination create a hostile and stressful social environment that may cause mental health problems.

Recent data indicate that IH is directly associated with mental health outcomes (8), with avoidance of HIV testing and identification as bisexual or straight in men who have sex with men (MSM) (but not HIV risk behaviors when sexual identification and race/ethnicity were controlled for) (9), and indirectly through the mediators of discomfort with discussing HIV status and condom use (10). Ryan et al. (11) found that family rejection of gay and lesbian adolescents was associated with an 8.4 times higher likelihood of attempting suicide, 5.9 times higher likelihood of depression, 3.4 times higher levels of using illegal drugs, and a 3.4 times higher risk of engaging in unprotected intercourse compared with teens who reported no or low levels of family rejection. A recent review of US studies (12) concluded that IH has minimal effect on risk behavior, although that conclusion has been criticized for being based largely on US data and for assuming a linear relationship between the two variables (13). However, Ross et al. (14) have demonstrated that IH predicts sexual risk behavior in gay men in Uganda, where homosexuality is heavily stigmatized. The data suggest that IH may vary significantly from country to country as a function of levels of discrimination at legal and structural levels as well as individual experience: that is, ambient homophobia is a major determinant of IH. European data from over a decade ago indicate that general population homonegativity is negatively associated with religion and immigration, and positively associated with urbanization and

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economic development (15, 16). EMIS is a European study with a unique opportunity to research IH in a range of political and social settings.

The European MSM Internet Survey (EMIS) (17) in 38 European countries is the first pan-European survey of MSM, by European researchers, and provides an opportunity to examine IH and both its structural predictors and its associations with HIV risk behavior in a large and geographically diverse sample, with sufficient countries to enable analysis by country-level (macro) as well as local (meso) and individual (micro) level variables. A short form of Ross and Rosser's IH scale has recently been developed with culturally stable items (18, 19) to make this possible. We report on an analysis of IH levels by country structural variables including legal discrimination and income inequality, and levels of experienced discrimination, and in turn its associations with HIV testing and preventive sexual behavior. We hypothesize that IH will be influenced by legal climate regarding LGB (Lesbian, Gay and Bisexual) variables and possibly other structural issues, and that IH will itself be associated with MSM's visibility and social context, and HIV-related prevention behaviors including HIV testing and condom use.

Methods

The methods of the European MSM Internet Survey have been described in ~~great~~ detail elsewhere (Weatherburn et al., submitted). In brief, EMIS is a joint project of academic, governmental, and non-governmental partners from 3~~8~~5 countries in Europe (EU and neighbouring countries) to simultaneously run an online survey in 25 different languages during summer 2010. EMIS was designed to inform the planning of prevention interventions for MSM by identifying prevention needs commonly unmet across MSM (priority aims), as well as subgroups of MSM who have many prevention needs poorly met (priority target groups).

Promotion and recruitment

The Internet-based self-completion survey study was promoted online and offline through various media for gay, bisexual, and other men who have sex with men (MSM) under the slogan 'Be part of something huge!' More than 235 local, national, and international Lesbian Gay Bisexual Transgender (LGBT) websites, undertook online recruitment and many of these organi~~z~~zations also promoted the survey offline, via posters, recruitment cards and face-to-face interaction. By visiting a promotion website men were exposed to banner advertisements inviting them to participate in the study. PlanetRomeo, Manhunt, Qruiser, Qguys, and Gaydar sent individual messages to their users inviting them to complete the survey. By clicking on the banner or the study link, potential respondents were directed to a survey "landing page" and asked to choose one of 25 languages for completion. Once they had chosen a language the first page described the study, including its purpose, its voluntary and anonymous nature, and gave contact information on how to contact the researchers.

Men were eligible to participate if they were: living in Europe, at or over the age of homosexual consent in the country they lived in, sexually attracted to men and/or having sex with men. They

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also needed to indicate that they understood the nature and purpose of the study and consented to take part.

The survey was physically located on servers owned and administered by the company Demographix.com, whose staff was responsible for testing it across different computer platforms/operating systems and with different web-browsers, and managing the technical aspects including back-ups and data delivery to the researchers. The data were protected with a 128-bit SSL encryption server, not accessible to the public. We neither collected the IP-address of participants' computers nor installed any cookies on it. The survey was available online between June 4 and August 31, 2010. EMIS could be completed in any of 25 languages, and the questions were identical in each language version. It took 21minutes to complete the survey on average. No study recompense was offered. All study procedures were approved by the Research Ethics Committee of the University of Portsmouth, UK (REC 08/09:21).

Data preparation and analysis

At the close of fieldwork there were 184,469 cases in the consolidated file. Partially completed surveys (moving away from the web page before pressing 'submit') were not captured. When downloaded 3 cases were lost due to data corruption and 2,427 cases were removed from the dataset because they gave no country of residence or a country of residence outside the study area. A further 544 cases were removed on the basis they were women, or men with no homosexual desire or experience, gave no age, or were under 13 or over 89 years old. This left a total of 181,495 cases meeting the qualifying criteria. Data from 291 cases from European countries and states that did not reach 100 qualifying cases were removed as were 6,995 cases with more than one inconsistency, defined as answers to two questions which cannot both be valid. Inconsistent data could be submitted by moving backwards and forwards in the survey and changing previously given answers. It could also be submitted simply by supplying inconsistent answers across one or more questions. Given the length and complexity of the survey, we allowed respondents to have one inconsistency in their given answers; but we excluded all cases with more than one inconsistency, suggesting giving random answers which is to be expected in a low-threshold questionnaire like EMIS. This left an analytic sample of 174,209 MSM from 38 European countries (17).

Measures and Analysis

Measures Analyses, unless otherwise indicated, were carried out using SPSS version 19.

Legal climate was measured by scoring the presence of the 6 legislative measures of LGB status (legal discrimination) listed by Wikipedia (20) in with a high score of 6 for presence of all legislative protections (homosexual acts are legal, recognition of same-sex relationships, same sex marriage, same-sex adoption, gays serve in the military, LGB antidiscrimination laws).

IH was scored according to the criteria described by Ross et al. and Smolenski et al. (18,19) as an additive scale of 7 items, ranging from 0 to 6 (Cronbach's $\alpha = 0.70$).

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Education was measured using the 6 levels of the International Standardizsed Classification of Educational Degrees (ISCED) corresponding to the educational system of each country.

"Outness" – defined as the proportion of people one is out to as gay or bisexual (family, friends, work or study colleagues) – was measured on a 5-point Likert scale from "all or almost all" to "none".

Proportion of male friends who are also attracted to men was measured on a 6-point Likert scale from "almost all of them" to "almost none of them" and "I don't have any male friends".

~~Size of settlement was measured on a 5-point scale from a "a very big city or town (a million or more people)", to "a village /the countryside (less than 10,000 people)".~~

Having ever had an HIV test was a binary (yes/no). We compared this binary variable with the extended variable of how long ago the respondent had had an HIV test (24 hours, 7 days, 1 month, 6 months, 12 months, 5 years, more than 5 years ago) and found that the two measures correlated 0.88. We thus decided to use the binary measure in analyses, particularly given the non-linear nature of the time measure.

Perceived control over sexual risk-taking was measured on a 5-point Likert scale anchored by "strongly agree" "and strongly disagree" with the statement "The sex I have is always as safe as I want it to be".

Relative frequency of condom use with non-steady partners was measured as "In the last 12 months, how often were condoms used when you had anal intercourse with non-steady male partners?" (6-point Likert scale "all or almost all" to "none").

The number of non-steady anal intercourse (AI) partners was asked as "How many non-steady partners did you have anal intercourse with in the last 12 months? (number).

Sexual diversity of practice: EMIS asked for the recency of a range of sexual practices with non-steady partners. Although this set was originally designed to reflect certain transmission routes for HIV and STIs, it can serve as a proxy for diversity of sexual practices, even if sexual practices with steady partners are not included. Sexual diversity was the sum of the 9 different types of sexual behaviors with non-steady partners reported in the past 6 months (mutual masturbation, oral insertive, oral receptive, anal insertive, anal receptive, rimming, being rimmed, and insertive and receptive "fist-fucking". These were recoded as binaries to reflect engaging in them or not in the past 6 months and summed to form a measure of the relative diversity of the respondents' sexual repertoires (Cronbach's $\alpha = 0.77$).

Size of settlement was measured on a 5-point scale from a "a very big city or town (a million or more people)", to "a village /the countryside (less than 10,000 people)".

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Legal climate was measured by scoring the presence of the 6 legislative measures of LGB status (legal discrimination) listed by Wikipedia (20) in with a high score of 6 for presence of all legislative protections (homosexual acts are legal, recognition of same-sex relationships, same sex marriage, same-sex adoption, gays serve in the military, LGB antidiscrimination laws).

The Gini coefficient of income inequality in a country was extracted from the UN Human Development Report coefficient for all countries (2008) with the exceptions of Cyprus, Malta, Luxembourg and Serbia, which were derived from an identical calculation method using the CIA Gini score (2008). The Gini coefficient ranges from 0 (all people in a country have equal income) to 1.0 (one person has all the income). It serves as a general economic measure of distribution of wealth.

~~Table 2 illustrates the response categories for participants with valid IH score.~~

Analyses

Analyses, unless otherwise indicated, were carried out using SPSS versions 19 and 20, on the 38 country dataset (Table 1). Cluster analysis of the 38 countries was carried out using SPSS 19~~8~~: a two-step procedure using Euclidian distances was employed, entering three variables: country LGB legal discrimination scores, proportion of MSM reporting verbal abuse, and proportion of MSM reporting physical violence because someone knew or presumed they were attracted to men. Three country clusters emerged including 9, 17, and, respectively, 12 countries~~,~~; with good fit (Silhouette coefficient of cohesion and separation = 0.65; Figure 1).

Bivariate analyses were carried out using χ^2 with Cramer's Φ as measure of effect size for ordinal data, and *t*-test (using Cohen's D as measure of effect size)(Table 2). Effect size statistic for univariable ANOVA for interval or ratio level data was η^2. Because of the large size of the sub-sample with valid IH scores (N=144,177), almost all analyses were highly statistically significant so *p* levels are not reported. Means of IH were graphed against selected structural and behavioral variables in Figure 1 to illustrate the relationship between variables. Regression analysi~~e~~s in Table 3 was ~~were~~ carried out by linear regression for interval- or ratio-level dependent variables using simultaneous entry in hierarchical blocks of individual demographic variables, individual behavio~~u~~ral variables, plus external source country level variables. Path coefficients calculations appear in Table 3 and in Figure 3 are reflected by β from the linear regressions in Table 3, ~~and~~ with path arrows indicate direction of ~~actual or~~ temporal relationship (e.g., IH cannot affect age so the relationship has to be in the opposite direction), or predicted relationship in the model. Stepwise linear regression was carried out for variables predicting Perceived Control over Sexual Risk-Taking in Table 4 to allow variables to enter in a forward hierarchical model.

Results.

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Basic demographic data are presented in Table 1 from participants with valid IH data. These data from 38 countries illustrate the *n*s for each country (ranging from 86 in Macedonia to over 39,000 in Germany), median age (ranging from 24 in Moldova to 36 in Switzerland and the UK), % living in a city >500,000 population (ranging from 3% in Malta to 87.7% in Turkey), % with tertiary education (ranging from 31.6% in Austria to 85.0% in Turkey), % employed (ranging from 54.9% in Romania to 85.3% in Malta), and % now in a relationship with another man (ranging from 22.5% in Bosnia-Herzegovina to 53.4% in Belarus to 53.4% in Belarus). IH scores ranged from 1.22 in The Netherlands and 1.23 in Sweden, to 2.57 in Bulgaria and 2.54 in Bosnia-Herzegovina.

~~Table 2 illustrates the bivariate associations with strong effect sizes predicting ever having had an HIV test, specifically being "out" and proportion of MSM friends, followed by education and size of settlement.~~ Data from the 38 countries clustered into three groups using (a) measures of legal climate supporting LGB rights, (b) proportion experiencing verbal discrimination, and (c) physical violence~~discrimination~~ because of assumed homosexuality. The three clusters of countries (Figure 1) characterized a group of "liberal" Scandinavian countries~~Northwestern~~ (Denmark~~dk~~, Finland~~fi~~, Norway~~no~~, Sweden~~se~~) Western (Belgium~~be~~, ~~fr~~, Ireland~~ie~~, ~~n~~The Netherlands~~l~~, United Kingdom, Spain~~uk~~) ~~and West-Central (at, ch, de, lu),~~ European countries~~;~~ a group of "~~"~~moderate"~~"~~ Central and Mediterranean countries~~Southwestern~~ (France, Portugal, Germany, Czech Republic, Switzerland, Italy, Austria, Slovenia, Hungary, Croatia, Bosnia-Herzegovina, Romania, Macedonia, Greece, Turkey, Estonia~~es, it, gr, pt~~) ~~and East-Central (cz, si, sk, hu, pl) European countries~~; and a group of "~~"~~conservative"~~"~~ Southeastern ~~(ba, bg, cy, hr, mt, ro, rs, tr)~~, Northeastern ~~(ee, lt, lv)~~, and Eastern European countries (Poland, Slovakia, Belarus, Lithuania, Latvia, Russia, Ukraine, Moldova, Bulgaria, Cyprus~~by, md, ru, ua~~), countries characterized by the highest levels of discrimination (note that IH was not part of the equation for this clustering process). Clustering countries on the basis of legal and self-reported personal discrimination against MSM provided both a potential validation of the measure of IH, and a means of conceptualizing geographic sub-sets of levels of discrimination (Figure 2). IH was closely related to the three discrimination-based clusters, with highest IH in the "conservative" countries and lowest IH in the "liberal" cluster of countries.

Using the measures of LGB legal climate (the strongest predictor), Gini coefficient, and size of ~~location~~ place of residence all predicted IH (Table 3, Figures 2 and 3). IH, in turn was associated with outness and age. The HIV-associated behavior most closely associated with IH were (a) ever being tested for HIV (mediated by outness), and (b) a perception of having no control over sexual risk-taking. Sexual diversity had a smaller impact. HIV testing was predicted, following outness as the major component, by the proportion of gay friends, highest educational attainment, and age.

A second linear regression limited to the demographics, HIV testing, "outness" and perceived control over sexual risk-taking onto IH indicated that those most closely associated with IH were lack of control over sexual risk-taking, and not being tested for HIV.

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Bivariate relationships between IH and country cluster, Gini coefficient septiles, LGB legal climate (Figure 2) show a relationship between these variables and IH. Sexual diversity illustrates (Figure 2) an increase in sexual diversity with decreasing IH and a more limited range of sexual activity with higher IH.

Table 2 illustrates the bivariate associations with strong effect sizes predicting ever having had an HIV test, specifically being "out" and proportion of MSM friends, followed by education and size of settlement.

Analysis of variance of IH score by relative frequency of condom use with non-steady partners, with covariates the number of non-steady partners that they had unprotected anal intercourse with in the past year and Pperceived Ceontrol over Ssexual Rrisk-Ttaking, demonstrated a small to moderate effect size (η^2=.03). An accelerating relationship between IH and relative frequency of condom use (covariates perceived control over sexual risk, and number of casual partners in the past year) with non-steady male partners was apparent (Figure 2). The strong relationship of Perceived Control over Sexual Risk-Taking in Figure 2 with condom use lead to an additional analysis of the predictors of this Perceived Control (Table 4). The highest stepwise predictors were number of non-steady partners one had anal intercourse with in the past 12 months; IH; GINI coefficient; and LGB legal climate.

Discussion

While these data represent 144,177 MSM in 38 countries, their collection via Internet constitutes a non-random sample. Previous Swedish data comparing Internet sexual data collection with questionnaire data from a large national random sample from a sexuality study in the same country (21, 22) indicate that general Internet samples tend to be somewhat younger, more likely to be single, better educated and urban., although Internet samples of MSM may be more bisexually-identified, worse educated and rural compared with traditional *gay venue questionnaire-based* samples in Sweden. The Swedish data indicate the known biases for Internet samples by comparing them with a national "gold standard" study. TThe EMIS data, are likely to be biased toward those who are better educated and Internet-literate, and probably more identified and familiar with the gay subculture. This sampling problem biaswill be more substantial in Eastern European countries where household Internet access is less common and smaller proportions of the whole MSM population participated in EMIS. On the other hand, the Law of Large Numbers would suggest that for the larger country samples, range is adequately represented. The three clusters which emerged of countries based on anti-gay discrimination are consistent with clusters of countries reported by Lottes and Akula (23) on self-expressed sexual values, including justification of homosexuality, in a pan-European sample. For groups who are discriminated against and highly stigmatized, there is no good alternative to Internet data collection for a study of this size. However, Internet biases are, from previous studies on sexuality, known and quantifiable.

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Structural variable relationships of IH

These data demonstrate the possible paths connecting anti-gay discrimination at legal and demographic levels with IH, along with size of place of residence. The relationship is clear despite relatively low variance in the tripartite cluster-based classification of country by legal and experienced discrimination level. Levels of IH are closely and linearly related to the "liberal", "moderate" and "conservative" clusters, providing criterion validity linking levels of discrimination and IH. IH in turn is closely associated with younger age, social measures of being "out" and connected with gay peers, which in turn are associated with HIV test-taking (Figure 3). While the effect size of a $\beta < .1$ is minor, generally, the greater the distance of a structural variable from an individual, the more difficult it is to achieve a large effect size. Paths from social climate variables to IH and behavior are measurable and quantifiable, given that this study has power to detect theoretically important differences from the "background radiation" of structural and social climate factors at a country level. While at the individual data level the study appears overpowered, at the country variable level the n is only 38. Figure 2 indicates graphically the relationships between IH and both structural and behavioral variables.

HIV testing and IH

Higher IH is also associated with decreased levels of ever HIV test-taking as mediated by "outness" (but not directly), and denying that their sexual conduct is always as safe as the respondents want it to be (Perceived Control over Sexual Risk-Taking). Thus, higher IH appears to both discourage HIV testing (which may be considered a marker of acknowledgement of stigmatized status) and also to reduce the ability to have safe sex despite the intention to do so. Diversity of sexual behavior (Figure 2) also appears to be restricted by IH, with lower sexual repertoire, possibly because of interactions limited by time, locale or anonymity.

Condom use and IH

Condom use for anal intercourse~~,~~ (controlling for number of non-steady sexual partners for anal sex, and the Pperceived Ceontrol over Ssexual Rrisk-Ttaking)~~,~~ revealed a relationship of lower IH with increasing condom use (Figure 2). This suggests that IH is associated with risky sexual behavior generally and condom use specifically ~~(Figure 4)~~. This unexpected implication of degree of control over sexual risk taking bore further investigation. Table 4 examines the stepwise predictors of Perceived Control over Sexual Risk-Taking and implicates structural variables (Gini coefficient, LGB legal climate), IH and age, plus the existence of social networks and being "out". How these variables amalgamate into lack of control over safe sex may involve fear, lack of access to condoms, surreptitious or no safety negotiations, lack of good preventive information, or need for rapid or anonymous sex, among other factors. Perceived Control over Safe Sex may have similarities to self-efficacy, and relationships between condom self-efficacy and structural discrimination and its internalization warrants further investigation.

Paths between structural variables, IH and HIV Risks

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These data indicate relationships between level of legal and experienced discrimination and IH, and in turn between IH and both outness and gay peer contact, and HIV risk behaviors. HIV risk behaviors associated with high IH include lower levels of HIV testing (not knowing HIV status and/or receiving treatment being a risk), lower levels of ~~v~~perceived control over ~~olitional~~ safe sex, and with lower levels of condom use for anal sex when this safe sex volition and partner numbers are controlled for. The relationship of the Gini coefficient and IH is interesting and here the Gini coefficient probably represents a level of attitude to equality beyond the purely economic (Figure 2) and is consistent with the association found between sexuality-related attitudes and human development indices (15,16, 23) in previous pan-European research.

Consistency with previous data

These findings on IH are consistent with previous data of Shoptaw et al. (9) on IH, albeit using a different IH measure, in African American MSM in Los Angeles, including their finding that IH is associated with lower HIV testing and education levels. It is also consistent with the pathways that Ross et al. (10) described in HIV seropositive U.S. MSM, where IH is associated with risk behavior through less openness, ~~and~~ discomfort with discussion of sexuality, not discussing HIV status, and lower condom use. The finding that there is a higher level of risk behavior (non-use of condoms with casual partners) is also consistent with the data of Ryan (11) in relation to the impact of family homonegativity in adolescents, and Sandfort on the impact of school psychological environment on mental health of Dutch LGB adolescents (24).

Impact of homophobic climate and IH and potential intervention levels

These data suggest, however, that IH may have pervasive effects on sexual behavior related to HIV prevention through the association of a homonegative legal and social climate with higher levels of risk and lower levels of preventive behaviors, at both personal and probably policy levels, although more research is required to elucidate these. Hatzenbuehler et al. (254) note that state-level protective policies modify the effect of sexual orientation on mental health disorders, and it is logical that one of the mechanisms for this may be through reduction of institutional discrimination, hate crimes, homonegativity and providing interventions to reduce internalized homonegativity. ~~No study in Europe has previously looked at HIV-preventive behavior and homonegativity.~~

The public health implications of these data are four-fold. First, it is clear that interventions must incorporate changes in the legal and policy climate (and perhaps religious climate) with regard to MSM. Second, such climate changes need to be communicated to professionals (including health care workers) who are at the government or professional interface with MSM clients, possibly with appropriate in-service training. Third, structural interventions should translate into the provision of specific services or outreach to MSM. Fourth, anti-IH measures for MSM might include individual-level opportunities on the Internet anonymously targeting stigmatized sexual minorities. These could be based on short, easily read informational modules, reduction of pathological stereotypes through pride-enhancing modules, role-model

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stories, and approaches to respond to the negative "voice within" or distancing strategies. The success of this study in reaching some 180,000 MSM via the Internet in three months, in 25 languages, in this study indicates the potential of this medium.

As far as we are aware, no study in Europe has previously looked at HIV-preventive behavior and homonegativity. From these pan-European data, homonegative stigma can be clearly linked through IH to increased HIV risk in MSM at both population and personal levels. Discrimination is bad law, bad policy, bad psychology and bad medicine: reducing homonegative policy and interactions at legal and social levels will have positive health as well as human rights impacts on MSM populations.

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Table 1: Demographic characteristics of MSM with Internalized Homonegativity scores

Top level domain	Country	*n* with IH score[1]	Median age	% Live in City > 500,000	% Tertiary education	% Employed[2]	% now in relationship with a man
at	Austria	3046	30	47.6	31.6	71.7	40.3
ba	Bosnia & Herzegovina	103	28	15.3	53.9	57.8	22.5
be	Belgium	3075	33	44.3	67.4	72.0	46.0
bg	Bulgaria	767	27	66.3	59.9	67.9	35.6
by	Belarus	296	27	63.5	68.9	79.7	53.4
ch	Switzerland	3819	36	13.3	47.8	80.0	43.4
cy	Cyprus	209	30	3.0	64.4	74.2	28.7
cz	Czech Republic	1809	27	46.6	42.9	65.3	50.1
de	Germany	39799	33	42.0	33.3	73.3	42.7
dk	Denmark	1254	33	52.5	50.4	67.6	35.6
ee	Estonia	469	30	9.2	48.4	72.7	40.0
es	Spain	9690	31	51.2	59.5	65.4	31.6
fi	Finland	1642	33	39.0	51.2	68.9	43.7
fr	France	8837	34	52.4	74.7	68.6	47.5
gr	.Greece	2214	30	70.5	65.9	69.3	35.4
hr	Croatia	410	29	54.3	64.5	62.9	36.8
hu	Hungary	1502	28	67.1	69.3	70.2	44.7
ie	Ireland (Republic)	1701	31	50.1	70.9	70.3	29.0
it	Italy	11905	33	35.6	43.9	68.8	37.2
lt	Lithuania	423	27	47.7	73.8	72.1	47.5
lu	Luxembourg	209	34	3.4	54.3	75.4	40.4
lv	Latvia	540	30	62.4	49.7	79.6	46.1
md	Moldova	87	24	62.8	59.8	64.4	49.4
mk	Macedonia	86	28	62.8	82.6	69.8	27.9
mt	Malta	95	33	1.1	61.1	85.3	39.4
nl	Netherlands	2903	39	42.2	62.4	76.9	45.4
no	Norway	1555	30	42.2	64.7	68.1	33.9
pl	Poland	1631	28	64.3	75.5	67.1	45.8
pt	Portugal	3858	30	43.5	60.1	69.5	39.0
ro	Romania	1593	27	46.7	58.3	67.4	38.5
rs	Serbia	822	28	54.6	56.6	54.9	33.6
ru	Russia	4041	30	79.2	73.5	83.7	52.7
se	Sweden	2215	35	54.8	55.6	73.5	40.5
si	Slovenia	673	30	1.8	47.5	64.3	39.5
sk	Slovakia	422	26	26.7	49.6	62.5	44.1
tr	Turkey	1312	28	87.7	85.0	65.3	34.5
ua	Ukraine	1332	29	70.7	76.0	83.2	50.9
uk	United Kingdom	13851	36	51.0	64.7	75.2	36.0

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[1]83.2% overall have IH scores

[2]Excludes students and unemployed

[3] 0-6 scale

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Table 2: Univariable analysis: predictors of ever testing for HIV

Variable	Untested	Ever tested for HIV	Statistic*
Cramer's Φ			
	%	%	
Being "out" to family/friends/colleagues (=Outness)			
All or almost all	16.2	83.8	
More than half	24.1	75.9	
Less than half	29.7	70.3	
Few	39.4	60.6	
None	57.3	42.7	0.28
Proportion of male friends attracted to men			
Almost all	14.8	85.2	
More than half	16.3	83.7	
Approximately half	20.2	79.8	
Less than half	28.5	71.5	
Almost none of them	44.6	55.4	
Have no male friends	45.6	54.4	0.26
Education (6 levels of ISCED**)			
No secondary qualification	38.5	61.5	
Some high school/trade qualification	34.2	65.8	
Lower secondary education	30.1	69.9	
Upper secondary education	33.2	66.8	
Higher education below degree level	24.4	75.6	
University degree completed	19.1	80.9	0.13
Size of settlement			
Very big city or town (1 million or more)	19.4	80.6	
Big city or town (½ to 1 million)	23.1	76.9	
Medium city (100,000 to ½ million)	28.5	71.5	
Small city (10,000 to 100,000)	35.0	65.0	
Village or rural area (<10,000)	36.7	63.3	0.15
	mean±SD		Cohen's *d*
Internalized Homonegativity	1.85±1.31	1.37±1.18	0.40

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Age	30.43±11.56	35.56±10.60	0.47

*Given sample size of 144,177 significance is not shown (144,177 cases with IH score are 82.8% of eligible cases with consistent data).

** The 6 levels of the International Standardised Classification of Educational Degrees.

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Table 3: Path analysis of Internalized Homonegativity and HIV-related risk behaviors

	β*	B	95% CI of B
Analysis 1			
Step 1: Structural variables predicting Internalized Homonegativity			
LGB legal climate (country level)	-.14	-.16	-.14 - -.13
Gini Coefficient (country level)	.09	.03	2.41 - 2.73
Size of settlement (individual level)	.08	.07	.06 - .07
Step 2: Individual demographic and behavioral variables predicting Internalized Homonegativity			
"Outness"	-.51	-.30	-.30 - -.31
Age (per year)	-.08	-.01	-.01 - -.01
Step 3: IH, social and demographic variables predicting having HIV test			
Internalized Homonegativity (per 1)	-.01	-.01	-.01 - -.01
"Outness"	-.21	-.07	-.07 - -.06
Proportion of gay friends	-.14	-.04	-.04 - -.04
Education	.10	.04	.04 - .03
Age (per year)	.17	.01	.01 - .01
Analysis 2			
Internalized Homonegativity as predictor of sexual variables			
Perceived control over sexual risk-taking (Y/N)	-.15	-.18	-.17 - -.19
Sexual diversity	-.01	-.01	0.01 – 1.01
Ever had an HIV test (Y/N)	-.13	-.40	-.38 - -.42
Relative frequency, condom use, non-steady partners past year	.03	.03	.03 - .03

* Which form path coefficients in Figure 3.

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Table 4: Stepwise predictors of Perceived Control over Sexual Risk Taking.

	β	B	95% CI of B
Number of non-steady partners in past 12 months	-.21	-.07	-.07 - -.06
Internalized Homonegativity	-.12	-.10	-.10 - -.09
GINI Coefficient	-.11	-.03	-.03 - -.03
LGB Legal climate	.03	.02	.01 - .03
Age	.03	.02	.02 - .03
Education	.02	.01	.01 - .02
Outness	-.02	-.02	-.02 - -.01
Proportion of gay friends	.01	.01	.01 - .02

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Figure 1~~1~~:

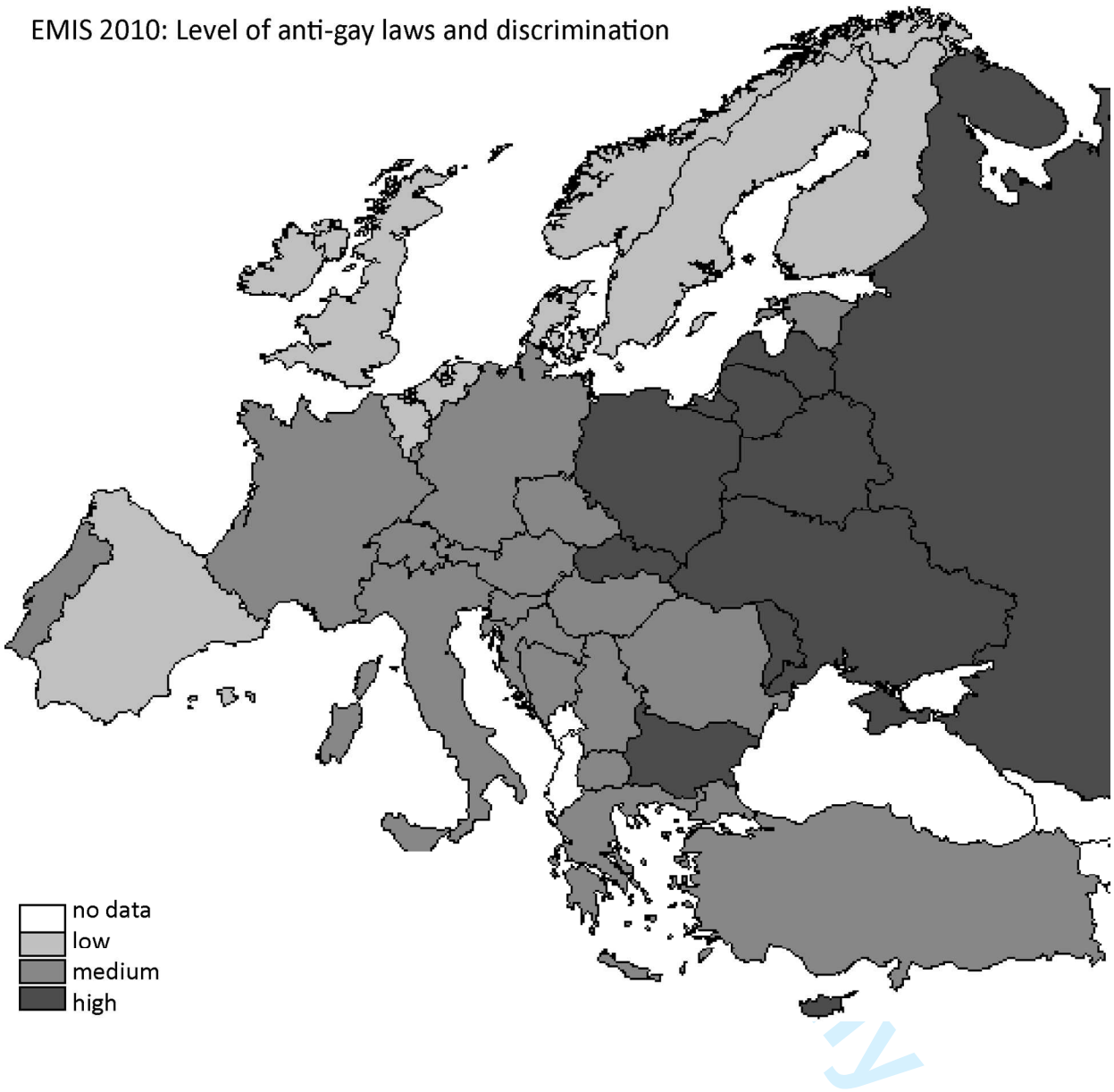

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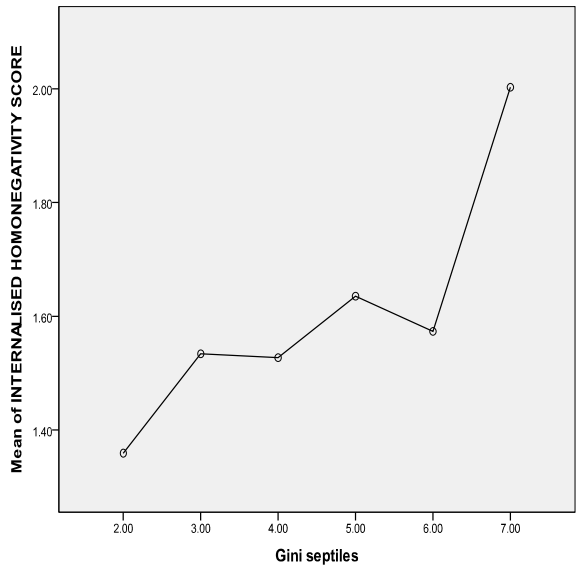
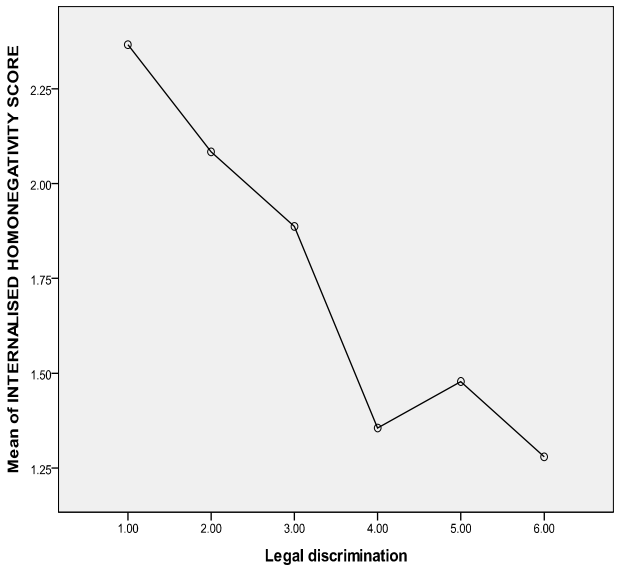
Figure 22: Relationship of Internalized Homonegativity to Social and Behavioral Variables

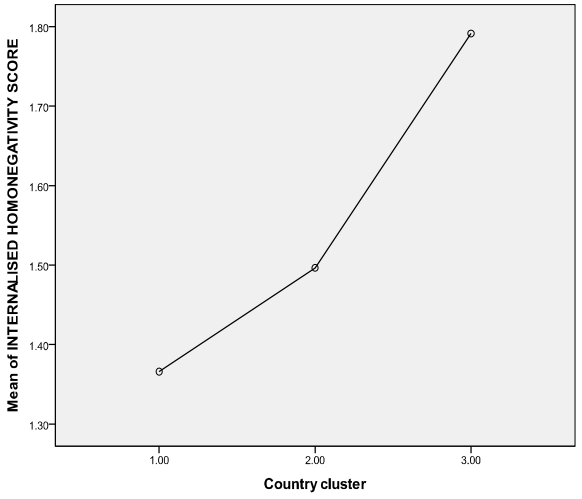
Relationship of Internalized Homonegativity to Gini Coefficient sextiles



Relationship of Internalized Homonegativity to Gay Legal Discrimination Index



Relationship between IH and Country Cluster



1=”liberal”; 2=”moderate”; 3=”conservative”

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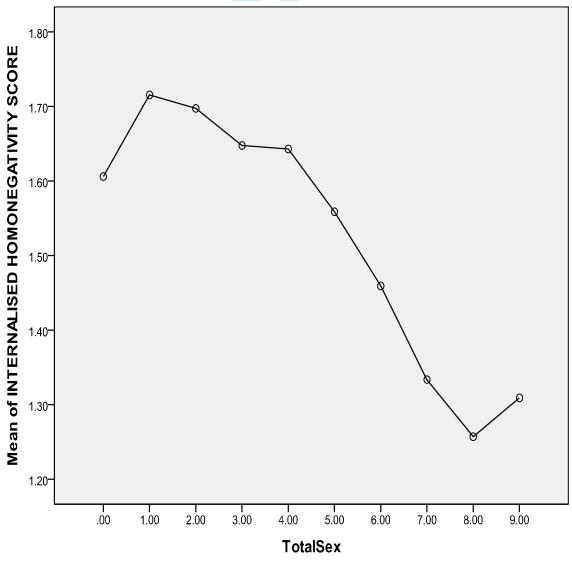
Relationship of Internalized Homonegativity to Sexual Ddiversity Score



Internalized Homonegativity score by Condom use for Anal intercourse with Non-steady Partners in past 12 months

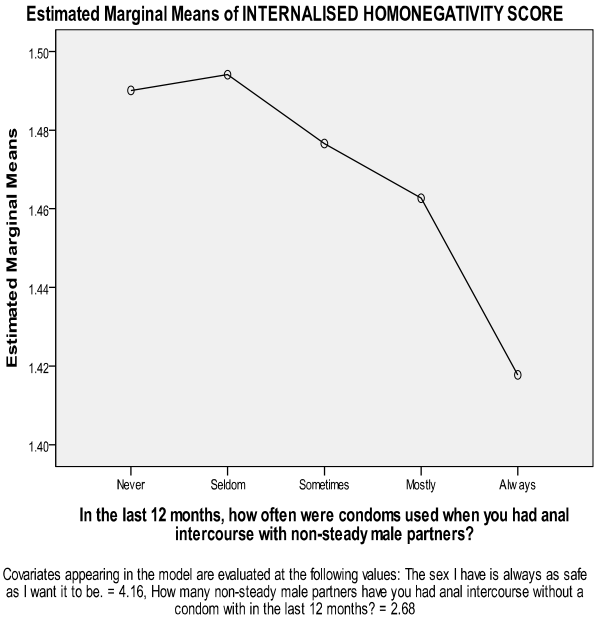


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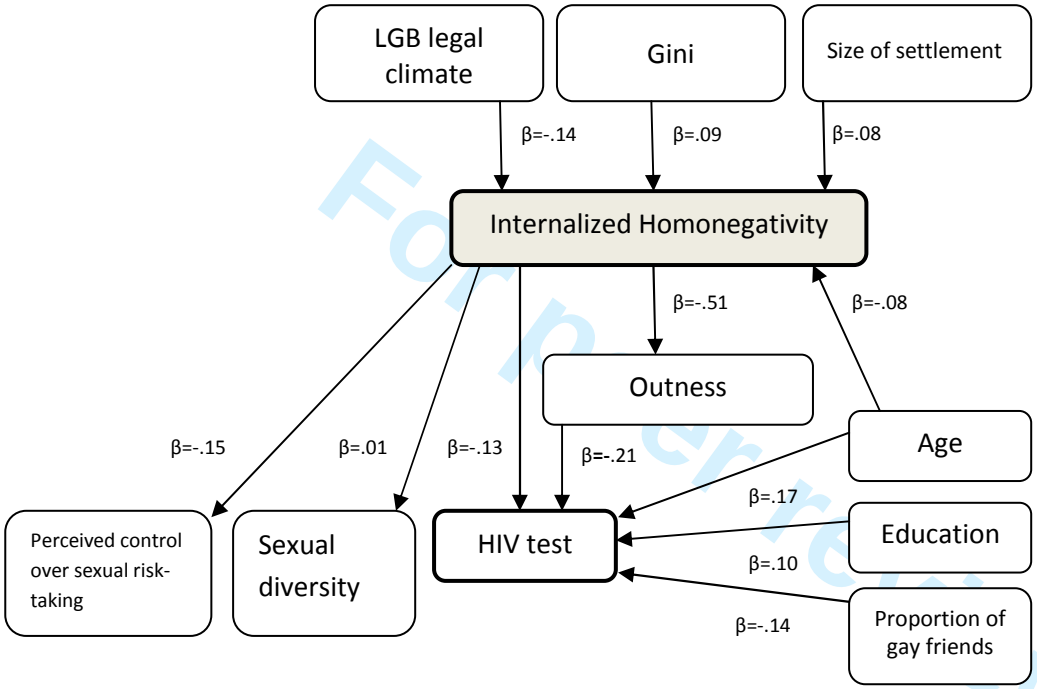
Figure 3: Paths Associated with Internalized Homonegativity



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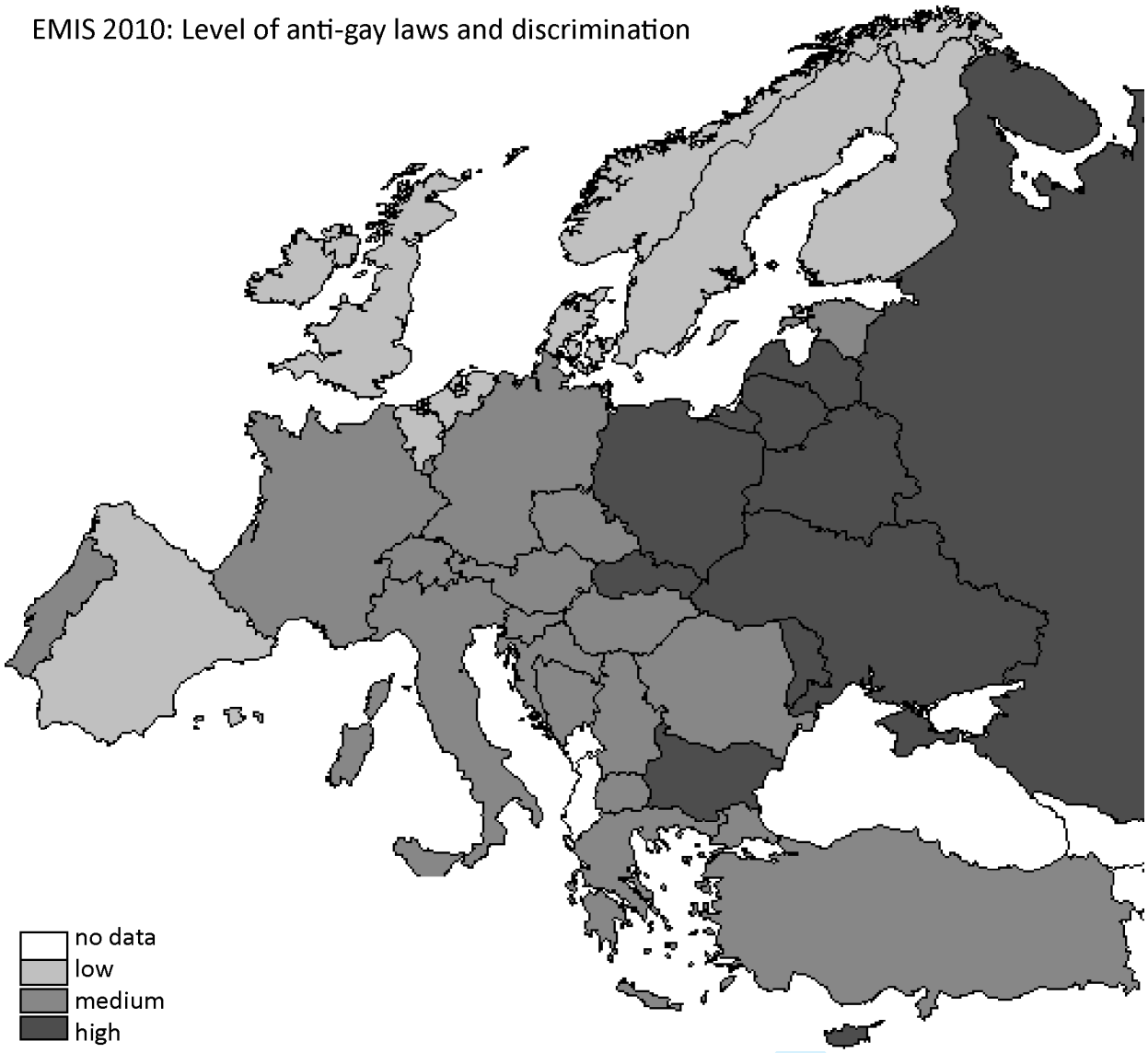

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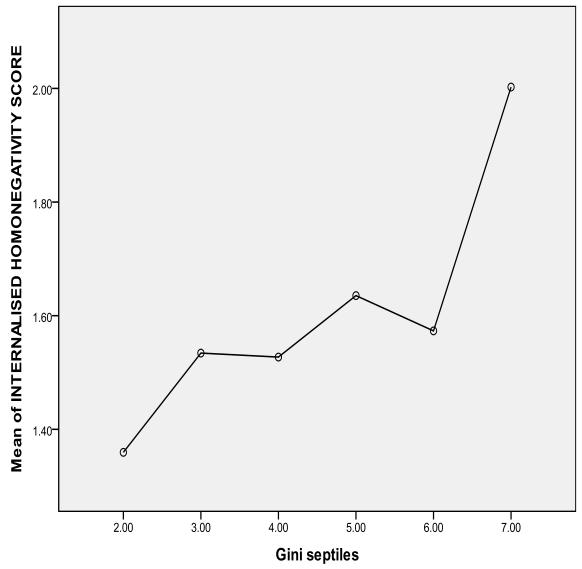
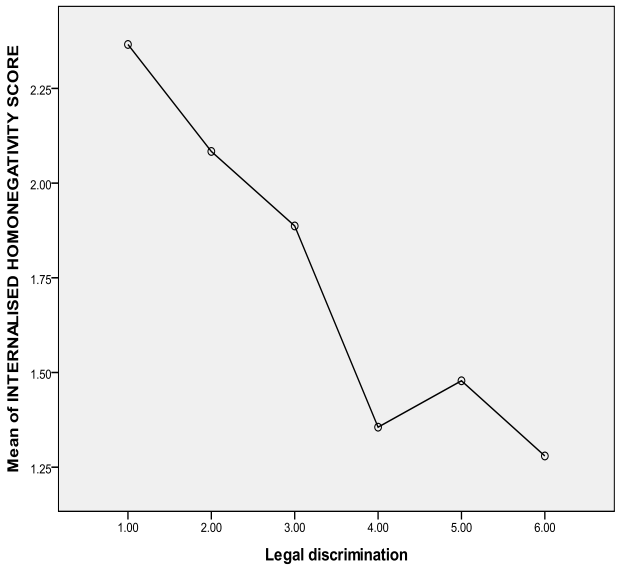


Relationship of Internalized Homonegativity to Gay Legal Discrimination Index



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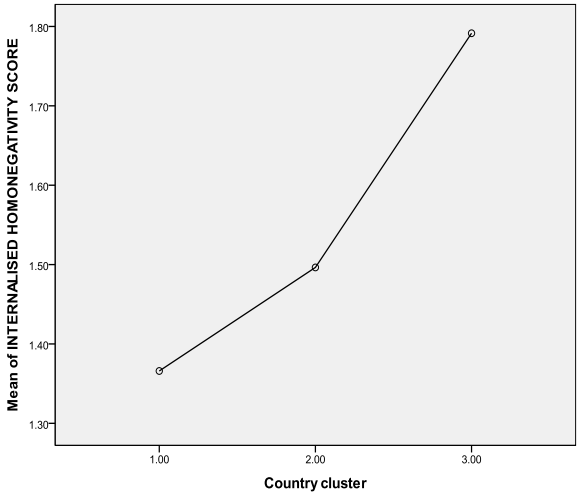

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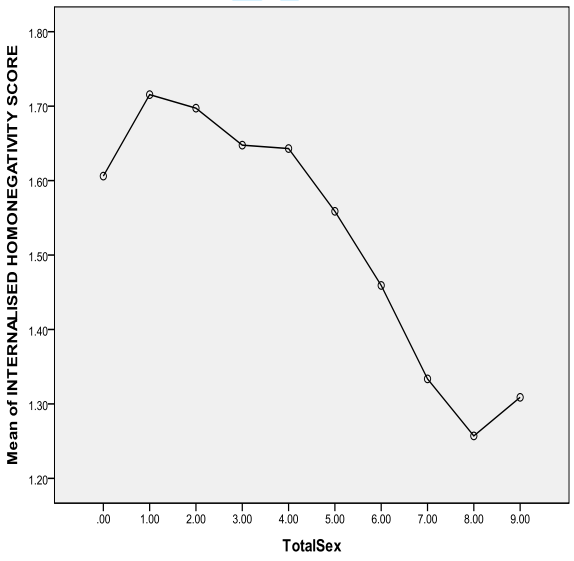
Relationship of Internalized Homonegativity to Sexual Diversity Score



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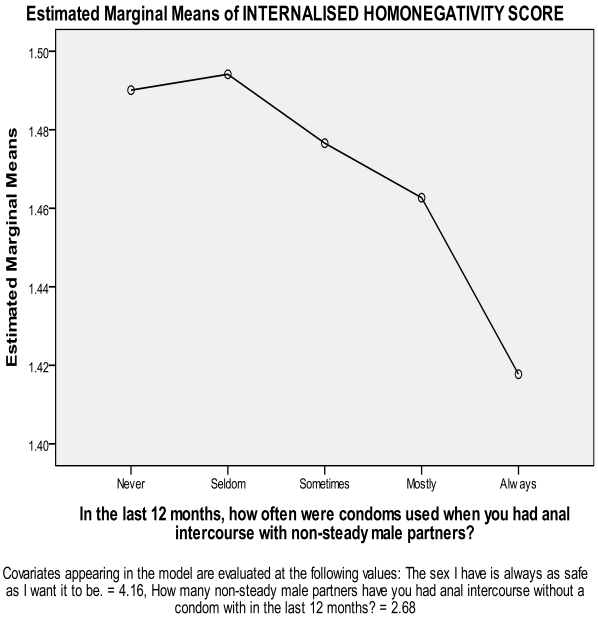

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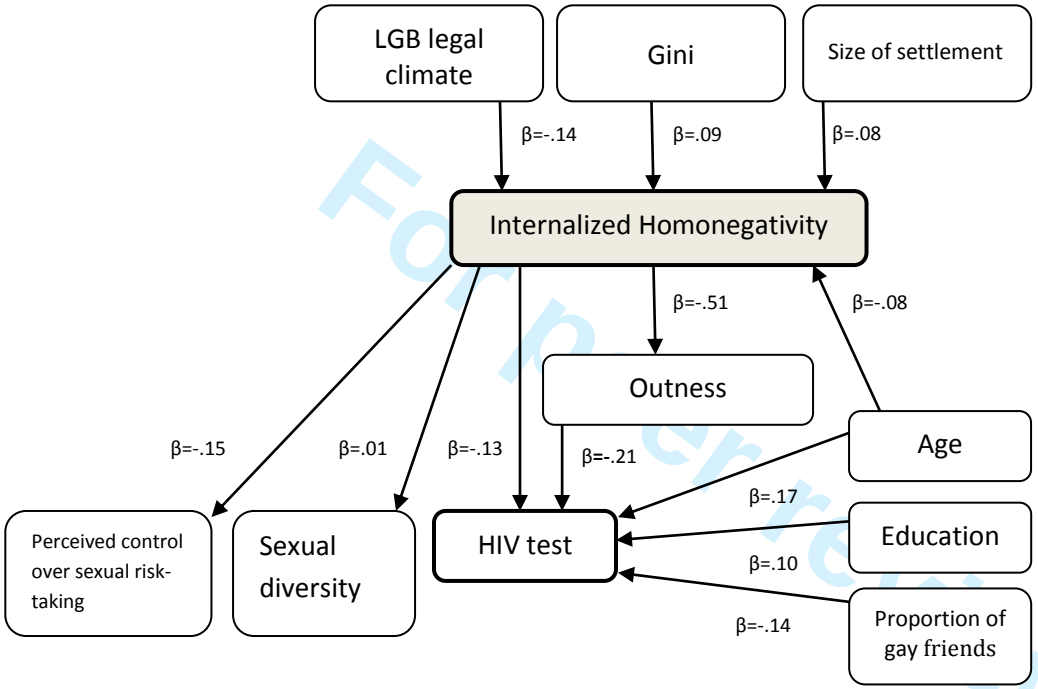

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