Undergraduate Senior Thesis:

The Interaction Between Internalized Homonegativity and Anonymous Profile Pictures on HIV-Risk-Taking Behavior in Gay Men Using Online-Dating Applications

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Abstract

While a relatively recent phenomenon, online-dating applications designed for men who have sex with men (MSM), such as *Grindr*, have become increasingly popular and are mostly used to solicit casual sex. The current research examined if internalized homonegativity moderated the relationship between anonymity on online dating applications and HIV-risk-taking behavior in gay men. Participants were 270 gay men (ages 18–69 years) who used at least one online dating application in the past three months. Participants completed an online survey measuring the extent to which their face was visible on their dating profile pictures, desire to be anonymous on online-dating applications, levels of internalized homonegativity, and HIV-risk-taking behavior including numbers of men with whom they had had casual sex, and frequencies of unprotected (receptive or insertive) anal intercourses in the past three months. Results showed significant interaction between profile anonymity and internalized homonegativity on HIV-risk-taking behavior. Participants who were more anonymous (less visible face) on their profile pictures and also high in internalized homonegativity engaged in more unprotected receptive (but not insertive) anal intercourse. The findings contribute to the existing literature and potentially identify the risk factors relating to HIV-risk-taking behavior in gay men who seek casual sex through online dating applications.

Acknowledgments

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The Interaction Between Internalized Homonegativity and Anonymous Profile Pictures on HIV-Risk-Taking Behavior in Gay Men Using Online-Dating Applications

Online-dating applications have existed for a relatively short time, yet they have significantly changed the way how gay men communicate with each other, establish relationships, and negotiate their own identities. Online-dating applications allow its users to chat and arrange meetups with other users nearby. One of the most popular online-dating applications catered towards men who have sex with men (MSM) is *Grindr*. Launched in 2009, *Grindr* is now widely recognized in the global LGBTQ+ community, and as of April 2016 has 2.4 million daily users and 6.0 million monthly users spanning 192 countries worldwide (Statista, 2017). *Grindr*, however, is not the only application designed for MSM. Applications such as *Jack'd*, *Hornet*, *Scruff*, and *Surge* also have several million users worldwide. Even dating applications marketed toward heterosexual populations, such as *Tinder*, have the option to swipe right or left for same-gendered users. Considering the relatively recent exponential increase in the usage and variety of these dating applications, there is not enough research available to fully draw conclusions on the implications of these applications on identity formation and relationship seeking patterns, including casual sex, among MSM.

Online-dating applications have simplified negotiating casual sex within the MSM population, and there have been concerns from medical practitioners that HIV-risk-taking behavior will significantly increase for men using these applications. In 2014, MSM accounted for 70% of the new HIV infections in USA (CDC, 2017). This number is extremely high and indicates that MSM should remain as a target group for HIV prevention efforts. The current data obtained from several research studies done predominantly in USA—but some also in China and Australia—is somewhat contradictory. One meta-analysis study found that, compared to those

who did not use online-dating applications, men using online-dating applications to seek casual sex tended to have significantly higher numbers of sexual partners, engaged more in unprotected receptive anal intercourse (URAI), and unprotected insertive anal intercourse (UIAI). On the other hand, those using online-dating applications were more likely to have been tested for HIV. In addition, the two groups where not different regarding the number of men diagnosed with HIV (Zou & Fan, 2017).

Mustanski (2007) examined the differences in HIV-risk-taking behavior between MSM who had sex with partners met online versus offline using survey and diary methods. While retrospective reports implied that MSM who found their partners online (vs. offline) engaged in more HIV/STI risk behaviors, the daily diary suggested that there were no significant differences in HIV/STI risk behaviors between these two populations. In fact, participants even used condoms more when having sex with a partner met online (vs. offline). The author speculated that there might be a third variable that might affect respondents' retrospective reports, such as individual differences in frequency of sex-seeking (i.e., some people might try to have sex more often and use internet as a convenient tool to find sex partners). While this study was done before the existence and increased usage of online-dating applications, it has implications for future research, suggesting that researchers should investigate individual personality traits and risk factors that might affect MSM's HIV-risk-taking behavior. It also encourages researchers to view online mediums, including online-dating applications, as a convenient platform for soliciting sex but *not* as a causal variable that explains HIV-risk-taking behavior.

Unique Stressor: Internalized Homonegativity

There have been few studies that have specifically looked at unique stressors associated with sexual minority identity as potential contributors in HIV-risk-taking behavior among MSM

who use online-dating applications. A few studies examined how concealment of one's sexuality and identity confusion moderated the relationship between intensity of application use and number of casual sex partners met via the application (Chan, 2017). Another study examined how users who posed as straight men in real life utilized online MSM mediums (Lemke & Weber, 2007). Results of these studies showed that concealment of one's sexuality and identity confusion were associated with higher number of casual sex partners (Chan, 2017), and that users who embodied straight men's identity in real life, yet nevertheless utilized MSM online accounts, were less likely to post recognizable profile pictures. Moreover, they also used online mediums less for finding friends and networking and more for seeking casual sex (Lemke & Weber, 2017).

Internalized homonegativity (IH)—the "internalization of societal anti-gay attitudes in lesbian and gay men" (Meyer, 2003, p.14)—is a stressor that may moderate the effect between application usage and HIV-risk-taking behavior in MSM. Several studies have examined homonegative attitudes as predictors of HIV-risk-taking behavior among MSM population (e.g., Jeffries & Johnson, 2015; Johnson, Carrico, Chesney, & Morin, 2008; Newcomb & Mustanski, 2011). Yet these studies have revealed somewhat contradictory findings. Some research suggests that men with homonegative attitudes are more likely to engage in higher HIV-risk-taking behavior, including lower odds of using condoms for vaginal sex with women and anal sex with men, as well as not getting tested for HIV (Jeffries & Johnson, 2015). Yet a meta-analysis revealed that relationship between IH and HIV-risk-taking behavior might be moderated by the time period from which the data was collected, with a stronger relationship for data from 1980s and 1990s compared to newer data (Newcomb & Mustanski, 2011). Furthermore, the authors highlighted inconsistencies in how internalized homonegativity was defined in past research

using outdated scales, and thus it might not be representative of current societal understanding and acceptance of homosexuality.

While LGBTQ+ rights have gained more acceptance in the United States and elsewhere, one should not assume that internalized homonegativity has fully disappeared. Homonegative attitudes are still present in society. In fact, they may become subtler, making homonegativity harder to detect. Thus, researchers should employ methodologies that works better at locating at-risk HIV subpopulations and examine internalized homonegativity in different ways.

The Current Study

The current study examined gay men's HIV-risk-taking behavior through the medium of online-dating applications and investigated how internalized homonegativity (or IH) interacted with dating profile anonymity. Anonymity in this study was operationalized as the extent to which participants' facial features were visible or recognizable on their online-dating profiles. In addition, because some people might not intend to be anonymous even if their face was hardly visible on their profile, their desire to be anonymous on online-dating applications was also used as one of the indicators for anonymity. Furthermore, because HIV-risk-taking behavior tends to be multidimensional, it was measured by three dependent variables: (a) frequency of unprotected receptive anal intercourse (URAI), (b) frequency of unprotected insertive anal intercourse (UIAI), and (c) number of casual sex partners. Given the literature reviewed above, the present study had three main hypotheses.

- **H1.** There will be a main effect of anonymity on HIV-risk-taking behavior. Higher anonymity will predict higher HIV-risk-taking behavior.
- **H2.** There will be a main effect of IH on HIV-risk-taking behavior. Higher IH will predict higher HIV-risk-taking behavior.

- **H3.** There will be an interaction effect of anonymity and IH on HIV-risk-taking behavior. Higher anonymity and higher IH will predict higher HIV-risk-taking behavior.

Methods

Participants

Participants were recruited through various online mediums: Amazon Mechanical Turk (MTurk), Reddit sites (i.e., Reddit groups or subreddits: AcGAYdemia, Gaymers, Grindr, Askgaybros, Gaysian, Sample size and /r/ainbow), Researchmath.org, and various listservs. Participants who were recruited from MTurk received a monetary compensation: US$0.50 each for participating in the survey; participants from all other mediums did not receive compensation. To be eligible, participants had to (a) identify as a man, (a) identify as homosexual/gay, (c) be 18 years or older, (d) be an active user of any online-dating app in the past three months, and (e) have had casual sex with at least one man they met through online-dating applications in the past three months. The three-month period was chosen to reduce human memory errors in self-report. Past research found that, for most sexual behaviors, including HIV-risk-taking behavior, recall periods of three months were the most reliable period in generating accurate data (Napper et al., 2009).

In addition, only male participants who identified as gay were included because the Internalized Homonegativity Inventory (IHNI) used in this study was designed to assess men who identified as gay. Further, the wording in the IHNI was specifically directed toward gay male participants (e.g., “I am proud to be gay” or “It is unfair that I am attracted to men instead of women”). Thus, the scale may not be appropriate for those who identify with other sexual orientations.

Among those who met the inclusion criteria, 21 HIV+ participants were excluded from

the analyses because HIV risk, not other STIs, is the main focus of this study. Thus, one could argue that condomless sex in HIV+ men is not considered risk-taking behavior because they have already been infected with HIV.

Table 1 shows demographics of the total sample (N = 270) included in this study.

Procedure

Participants selected how many online-dating applications they had used during the past three months. Then, from a list of dating applications, they selected the dating application they used to solicit casual sex with other same-sex users. If participants used more than one application, then they would select the one they used the most to solicit casual sex. For the rest of the survey, participants answered questions, including their anonymity and HIV-risk-taking behavior, thinking about the application they selected previously.

The study was approved by the institutional review board of the University of Florida.

Measures

Anonymity. This study employed three separate measures to assess participants' anonymity on their online-dating applications.

***Face visibility from most recent online-dating profile pictures*.** I revised an item measuring face visibility on profile pictures (Lemke & Weber, 2017) to make it fit the purpose of the present study. Face visibility in this study was measured by a single item asking how visible participants' faces were on their profile picture(s). Responses ranged from 1 (*My face is clearly visible*) to 2 (*My face is partially visible*) to 3 (*My face is not visible*). Higher scores indicated higher anonymity.

For "clearly visible" faces, the instruction stated: "For the face to be clearly visible, your face in the picture must be clearly seen and recognizable. For example, the resolution of the

picture is reasonably good (not too blurry) and most of your facial parts can be seen. There is no intentional censorship on your facial parts (e.g., censoring your eyes with a black strip). In other words, people who know you will easily recognize you by just seeing this picture."

For "partially visible" faces, the instruction stated: "For the face to be partially visible, your face in the picture can be seen but not very clearly or recognizable. For example: bad picture resolution, not staying close enough, almost hidden in a group of people, or turning some parts of your face away. Although your face can be seen, some or most of your facial parts are hard to see (e.g., 1/2 or 2/3 of your face is covered by hair or head wears such as hats). In other words, people who know you may have a hard time recognizing you by just seeing this picture but will still be able to identify who you are if they really pay attention."

For "invisible" faces, the instruction stated: "For the face to not be visible, your face in the picture is not recognizable or not even shown. For example, very blurry resolution, staying too far, hidden in a big group of people, or turning most or all of your face away. Your face is hardly seen or even cannot be seen (e.g., using intentional censorship, cropping out your face from the picture, covering more than 2/3 of the face with hair or head wears such as hats, showing specific body parts without your face being visible [e.g., torso, butt, genitals]). In other words, even people who know you will not be able to recognize you by just seeing this picture."

In addition, if participants had more than one picture on their most recent profile, then they would answer the face-visibility item for each picture posted on their most recent profile (up to 6). All values were then averaged to get the mean face-visibility scores.

***Face visibility from all profile pictures posted in the past three months*.** Because the most recent picture(s) at a time of the study may not represent one's overall profile pictures, the study also included another face-visibility item for profile pictures *in general*. The second

measure of face visibility, therefore, is similar to the first one, except that this item asked participants to think about their face visibility based on all of their profile pictures posted in the past three months. Higher scores indicated higher anonymity.

***Desire to be anonymous on online dating applications*.** The third assessment of anonymity asked participants to report their own desire to be anonymous on their dating application ("I want to appear anonymous while using [name of their most used application to seek casual sex]") on a five-point scale (1 = *strongly disagree* to 5 = *strongly agree*). Higher scores indicated higher anonymity.

Moderator: Internalized homonegativity (IH). Internalized homonegativity was measured using the 23-item Internalized Homonegativity Inventory (IHNI; Mayfield, 2001). Example items included "I feel ashamed of my homosexuality," "I am thankful for my sexual orientation (reversed)," and "I believe it is morally wrong for men to be attracted to each other." Reponses were on a six-point scale (1 = *strongly disagree* to 6 = *strongly agree*). Higher scores indicating higher IH.

Outcome: HIV-risk-taking behavior.

***Unprotected insertive anal intercourse (UIAI)*.** Participants were asked: "In the past 3 months, how many times did you have unprotected (condomless) insertive anal sex (you were topping) during casual sex with men you met through [name of their most used application to seek casual sex]?" Participants were instructed to type a zero if they always used a condom when they had insertive anal sex in the past three months (i.e., no unprotected sex), and "N/A" if they never had insertive anal sex in the past three months.

***Unprotected receptive anal intercourse (URAI)*.** Participants were asked: "In the past 3 months, how many times did you have unprotected (condomless) receptive anal sex (you were

bottoming) during casual sex with men you met through [name of their most used application to seek casual sex]?" Participants were instructed to type a zero if they always used a condom when they had receptive anal sex in the past three months (i.e., no unprotected sex), and "N/A" if they never had receptive anal sex in the past three months.

***Number of casual sex partners*.** Participants were asked: "In the past 3 months, using [name of their most-used application to seek casual sex],how many men did you have casual sex with?" Participants were instructed to type a zero if they did not have casual sex with any men.

Data Analysis

A series of multiple regression analyses were conducted separately, regressing each of the three DVs on each of the three anonymity measures (9 analyses total). The analyses tested the main effect of anonymity, the main effect of IH, and the anonymity-by-IH interaction effect on HIV-risk-taking behavior. Correlations, means and standard deviations of model variables were also calculated (Table 2). Participants' age was first included as a possible covariate; however, it did not have significant results in most of the analyses and adding it as a covariate did not change the main findings. Therefore, age was removed from the final statistical analyses. An alpha level of .05 (two-tailed) was adopted as the criterion for establishing statistical significance.

Results

Effects of Anonymity

In all nine analyses, there was no significant main effect of any of the three anonymity measures on HIV-risk-taking-behaviors.

Effects of IH

In all nine analyses, there was no significant main effect of IH on HIV-risk-taking-behavior.

Anonymity-by-IH Interaction

Results showed that the interaction between participants' face visibility from *most recent* dating profile pictures and internalized homonegativity was significant ($p < .001$), but only when the DV was frequency of URAI in the past three months (Table 3). Participants whose recent pictures were less visible (more anonymous) and also scored higher on IH were more likely to engage in URAI with a partner or partners they had met through a dating application (Figure 1).

Similarly, the interaction between participants' face visibility from *all* profile pictures in the past three months and internalized homonegativity was significant ($p = .002$), but only when the DV was frequency of URAI in the past three months (Table 4). Participants whose pictures were less visible in general (more anonymous) and also scored higher on IH were more likely to engage in URAI with a partner or partners they had met through a dating application (Figure 2).

There were no other significant interaction effects for other variables.

Discussion

Neither profile anonymity or internalized homonegativity had significant main effect on HIV-risk-taking behavior; thus, H1 and H2 were not supported. In addition, the hypothesis that internalized homonegativity would moderate the relationship between anonymity and HIV-risk-taking behavior (H3) was partially supported. First, the interaction was found only when the IV was face visibility from the *most recent* profile pictures and face visibility *in general* based on all profile pictures in the past three months, but not reported desire to be anonymous. Second, the interaction had significant effect on HIV-risk-taking behavior only when the DV was frequency of unprotected receptive anal intercourse (URAI) in the past three months. None of the IVs or

their interactions predicted frequency of unprotected insertive anal intercourse (UIAI) or number of casual sex partners in the past three months. Nonetheless, URAI is the riskiest sexual practice that drastically increases one's chances of getting infected with HIV—it is the third highest possible way of acquiring HIV after blood transfusion and needle sharing (Patel et al., 2014). Thus, the findings successfully addressed the subpopulation among gay men who should be targeted for safer-sex interventions. Taken together, the findings suggest that, among gay men who solicited casual sex through online dating applications, those who appeared to be more anonymous on their profile and also endorsed more internalized homonegativity had more unprotected receptive anal sex, and thus might become more at risk for HIV/AIDS.

The current findings might be partially explained by previous research showing that men with strong prejudice towards men identifying as gay tend to not be salient towards adhering to safer sex practices or worrying about testing for HIV because they are trying to mentally distance themselves as far away as possible from the LGBTQ+ community and some men might consider HIV as a disease only affecting the gay population (Boone & Duran, 2009). Thus, someone who is high in IH might avoid associating with anything related to the LGBTQ+ culture, even considering getting tested for HIV or adhering to safer sex practices because of their belief that it is something that only concerns gay men.

It is interesting to note that participants' own desire to be anonymous on their online dating applications did not predict higher HIV-risk-taking behavior alone and/or in combination with IH. It is possible that face anonymity scores might be more strongly associated with participants' desire to use their application to seek casual sex. Faceless pictures might indicate to other users that the participant is looking for hookups rather than friendships or long-term relationships. Future research should examine sociosexual orientation—the tendency to have

casual sex relationships that are uncommitted—and sexual sensation seeking—the need to engage in varied, novel sexual experiences—as potential variables that are linked to face anonymity scores on online-dating applications and potential influencers of HIV-risk-taking behavior. For example, one study showed that MSM high in sexual sensation seeking tend to engage in more unprotected anal sex (Xu et al., 2016).

Higher anonymity on online dating applications might predict increased interest in using these apps to engage in casual sex with other men (Lemke & Weber, 2017). Thus, increased sexual activity, combined with unwillingness to practice safe sex might lead to increased HIV-risk-taking behaviors, such as engaging in more URAI. This does not, however, explain why participants would only engage in more URAI but not UIAI. There were also no significant findings for increased number of casual sex partners for any of the main effects or interactions. This means that participants in this study did not have more casual sex partners from their online-dating applications even when they appeared to be more anonymous on the applications or endorsed high internalized homonegativity (or both).

The biggest difference between UIAI and URAI, in terms of condom use, is that for UIAI, one needs to put on a condom on his own phallus, whereas for URAI his partner is the one wearing a condom. Thus, in the first instance, putting a condom on oneself is an active role that one can perform during sex, while in the latter instance, counting on one's partner to put on a condom is a passive role. It is possible that gay men who appeared to be anonymous on their profile and also high in IH are unwilling to communicate their sexual preferences to their partners and, as a result, may not be assertive about condom use when having receptive anal sex. This might be related to their high IH and possible high sexual sensation seeking as indicated by their faceless profile pictures. In other words, someone who feels strong negative emotions about

their sexuality will want to consciously distance themselves from the sexual act that they are engaging in, thus voicing their sexual preferences and concerns about condom use during sex might reinforce the fact that they are sexually attracted to men and could be seen as them admitting their non-straight sexuality. For example, in one study, HIV+ MSM who were open about their sexuality to others were 2.1 times more likely to tell their casual sex partners their HIV status before engaging in sex compared to HIV+ MSM who were not open about their sexuality (Rosser et al., 2008). Thus, future research should investigate links among IH, sociosexual orientation, and condom use assertiveness as predictors of increased HIV-risk-taking behavior in gay men.

Overall, the findings suggest that it is vital to consider psychosocial factors, such as internalized homonegativity, in addressing HIV-risk-taking behavior in gay men who appear to be anonymous when using online-dating applications.

Limitations and Future Directions

The current study asked participants to indicate how many profile pictures they had posted on their most-used online-dating applications, with answer choices ranging from one to more than six. Nevertheless, some apps, like Grindr, allow its users to opt out from posting *any* pictures on their profile, leaving a blank icon instead of a profile picture for other users to see. With this in mind, participants who have posted zero pictures on their dating accounts would not be able to select “zero” as one of the answer choices. As a result, some participants might misinterpret the questions. For example, someone with zero profile pictures might think that the question asked them to report their face visibility on pictures they typically send to other users through personal chat (in this case they might score low on anonymity). On the other hand, it is also possible that participants who did not upload any picture at all might indicate that their face

was “not visible” (in this case they would score high on anonymity). Therefore, future research should include a zero option when investigating face visibility from dating profile pictures.

The next limitation is that participants recruited from Amazon MTurk may not be representative of the gay men population and might provide unreliable or false responses. Because my inclusion criteria were very specific, some MTurk workers might still take the survey despite their ineligibility to receive a compensation. Keeping this in mind, I employed several measures to reduce low quality responses such as attention check, eligibility screening items, as well as a set up that prevented participants from retaking the survey. It is still possible, however, that participants from MTurk might still provide data with lower quality.

Unlike MTurk, fraud and false responses are of less concern for the data obtained from other sources (e.g., Reddit sites) because participants understood that their participation was completely voluntary. Without any compensation, “faking” eligibility should be less likely. However, because the study was distributed through the mediums targeting LGBTQ+ (e.g., Reddit sties for MSM), the data from participants recruited through these sources may be biased. For example, they may be more open to homosexuality, and thus have lower internalized homonegativity, than the normal population. Whereas those who were still “in the closet” (and arguably should have higher internalized homonegativity) might not see the study or care to participate. Thus, future research should find more effective recruitment methods to yield representative and generalizable data.

Another limitation is that the study did not investigate participants’ use of pre-exposure prophylaxis (PrEP) in the past three months. Research showed that taking PrEP regularly can reduce chances of getting infected with HIV by 92% (Grant, 2010). Therefore, people who take PrEP regularly may decide not to use protection as the risk of acquiring HIV becomes much

lower. Therefore, one could argue that frequency of condomless sex in PrEP users may not indicate HIV-risk-taking behavior. However, although PrEP may reduce chances of HIV infection, having UAI while being on PrEP may still indicate risky sex because a combination of PrEP and condom use is still recommended for the most effective prevention against HIV and other STIs. Nevertheless, future research should control for PrEP usage in the analysis to remove the potential confounding effect of PrEP.

In addition, the study did not measure participants' relationship status, occupation, and openness about their sexuality (e.g., closeted, in the process of coming out, open about their sexuality). Relationship status and occupation might influence users' desire to remain anonymous on their online-dating applications, which might have nothing to do with their internalized homonegativity (e.g., men in a committed, exclusive relationship may choose to be anonymous to avoid being caught by their partner). Further, future studies should examine a degree of sexuality openness because adding this variable may explain more variance in the model (e.g., being closeted may mediate the relationship between internalized homonegativity and anonymity, which in turn relate to more HIV-risk-taking behavior).

Next, the current study only focused on cisgender men. Future research should investigate how transgender individuals are affected by the recent increase of online-dating applications, particularly focusing on male-to-female transgender individuals who are at a higher risk for HIV infection (Benotsch, 2016).

A final limitation is that, by using the Internalized Homonegativity Inventory (IHNI), the present study could only recruit men who self-identified as gay. It could be possible that men who struggled with homosexual feelings and engaged in homosexual behaviors might score so high on the IH Scale that they refused to identify as gay. Future research should employ a scale

that addresses broader contentions towards one's own sexuality without necessarily excluding other sexual minority subgroups. In addition, researchers should develop a scale that can assess one's own dissatisfaction towards themselves for failing to be heterosexual. By employing such a scale, a higher number of participants might be recruited for research studies, providing us with a better understanding of emotional turmoil that governs the lives of not only gay-identifying men, but also those who identify with other sexual orientations (including heterosexual).

Conclusion

The present findings suggest that, although neither anonymity or internalized homonegativity related to higher HIV-risk-taking behavior, being high in internalized homonegativity *and* appearing anonymous on dating profiles can be risk factors for unprotected receptive—but not insertive—anal intercourse. The present study also provides evidence supporting the need for intervention programs that help minimize internalized negative feelings towards one's sexuality among gay men who choose to be anonymous on their online-dating applications. The present findings also have potentially profound implications for HIV-risk-reduction interventions by targeting an MSM subpopulation that are at risk for contracting HIV.

Table 1. Demographics

	Participants (*N* = 270)
Age	
Mean (SD)	30.68 (10.63)
Range (min – max)	18 – 69
Race/ Ethnicity (*n*, %)	
European/ White	190 (70.4%)
Asian	23 (8.5%)
African American/ Black	22 (8.1%)
Hispanic/ Latino	21 (7.8%)
Native American	6 (2.2%)
Middle Eastern	1 (0.4%)
Other	7 (2.6%)
Education (*n*, %)	
Less than high school	2 (0.7%)
High school diploma	25 (9.3%)
Some college	85 (31.5%)
Bachelor's degree	108 (40.0%)
Master's degree	34 (12.6%)
Ph.D., M.D., Ed.D.	16 (5.9%)
Household income (*n*, %)	
< $20,000	42 (15.6%)
$20,000 - $50,000	94 (34.8%)
$50,000 - $80,000	74 (27.4%)
> $80,000	60 (22.2%)
Duration of application use (*n*, %)	
Less than 1 month	4 (1.5%)
1 month or more but less than 6 months	34 (12.6%)
6 months or more but less than 1 year	60 (22.2%)
1 year or more but less than 5 years	120 (44.4%)
5 years or more	52 (19.3%)

Table 2. Correlations, means and standard deviations of model variables

	Mean (SD)	1	2	3	4	5	6
1. Anonymity (face visibility on most recent profile pictures)	1.563 (.743)						
2. Anonymity (face visibility on all profile pictures)	1.373 (.694)	.670**					
3. Desire to be anonymous	2.663 (1.356)	.551**	.512**				
4. Internalized homonegativity	49.267 (22.645)	.207**	.110	.242**			
5. HIV-risk-taking behavior (URAI)	1.519 (3.232)	.077	.061	-.058	.074		
6. HIV-risk-taking behavior (UIAI)	1.405 (3.139)	.073	-.009	.062	-.054	.452**	
7. HIV-risk-taking behavior (number of partners)	4.224 (5.290)	-.028	-.043	-.096	-.121*	.475**	.139*

**p<.05 (two-tailed), **p<.01 (two-tailed)*

Table 3. Multiple Regression Analysis for URAI in the past 3 months for face visibility on the most recent profile pictures (N = 235)

Variable	*b*	*SE*	β	*t*	*p*
IH	.005	.009	.036	.546	.585
Anonymity	.297	.296	.066	1.006	.315
IH × anonymity	.049	.014	.229	3.561	.000

Note. R^2 = .061. DV = URAI in the past 3 months (unprotected receptive anal intercourse) with men met through an online-dating application. Anonymity = face visibility on the most recent profile pictures (higher scores = higher invisibility or higher anonymity).

Table 4. Multiple Regression Analysis for URAI in the past 3 months for face visibility on all profile pictures (N = 227)

Variable	*b*	*SE*	β	*t*	*p*
IH	.008	.009	.059	.902	.368
Anonymity	.233	.308	.049	.757	.450
IH × Anonymity	.043	.014	.200	3.095	.002

Note. R^2 = .048. DV = URAI (unprotected receptive anal intercourse) in the past 3 months with men met through an online-dating application. Anonymity = face visibility on all profile pictures (higher scores = higher invisibility or higher anonymity).

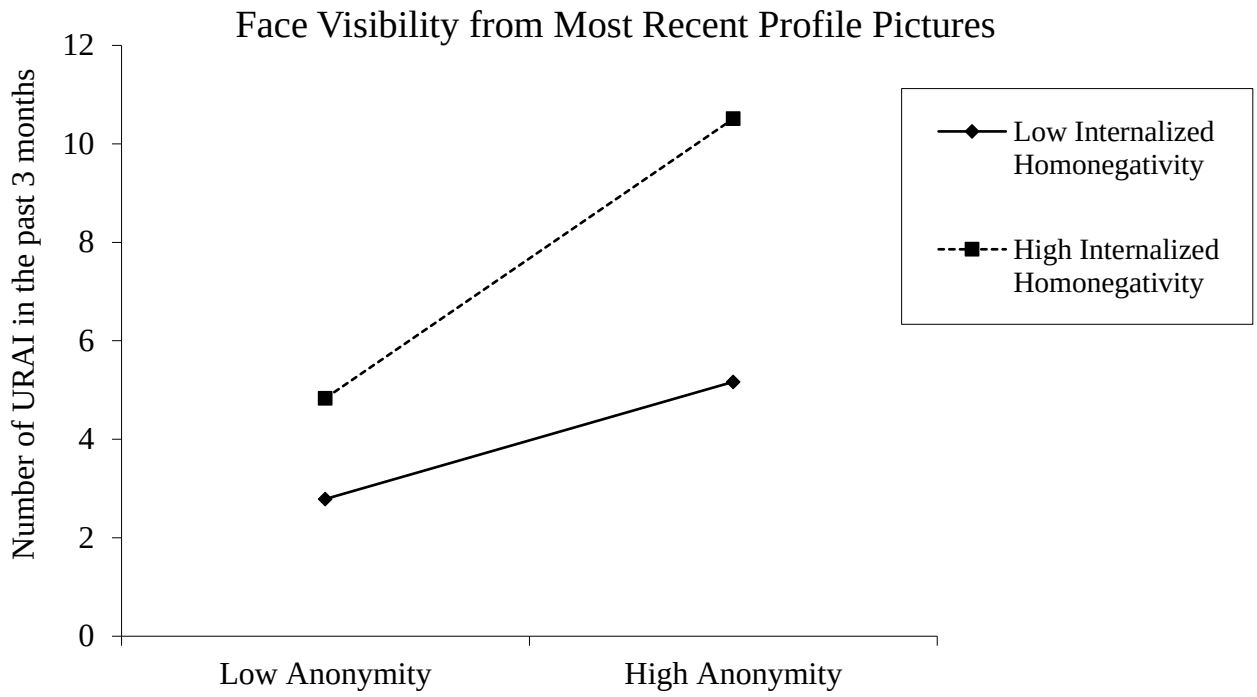

Figure 1. Interaction between participants' face visibility from their most recent profile pictures (higher scores = more anonymous) and internalized homonegativity. DV = number of URAI (unprotected receptive anal intercourse) in the past three months.

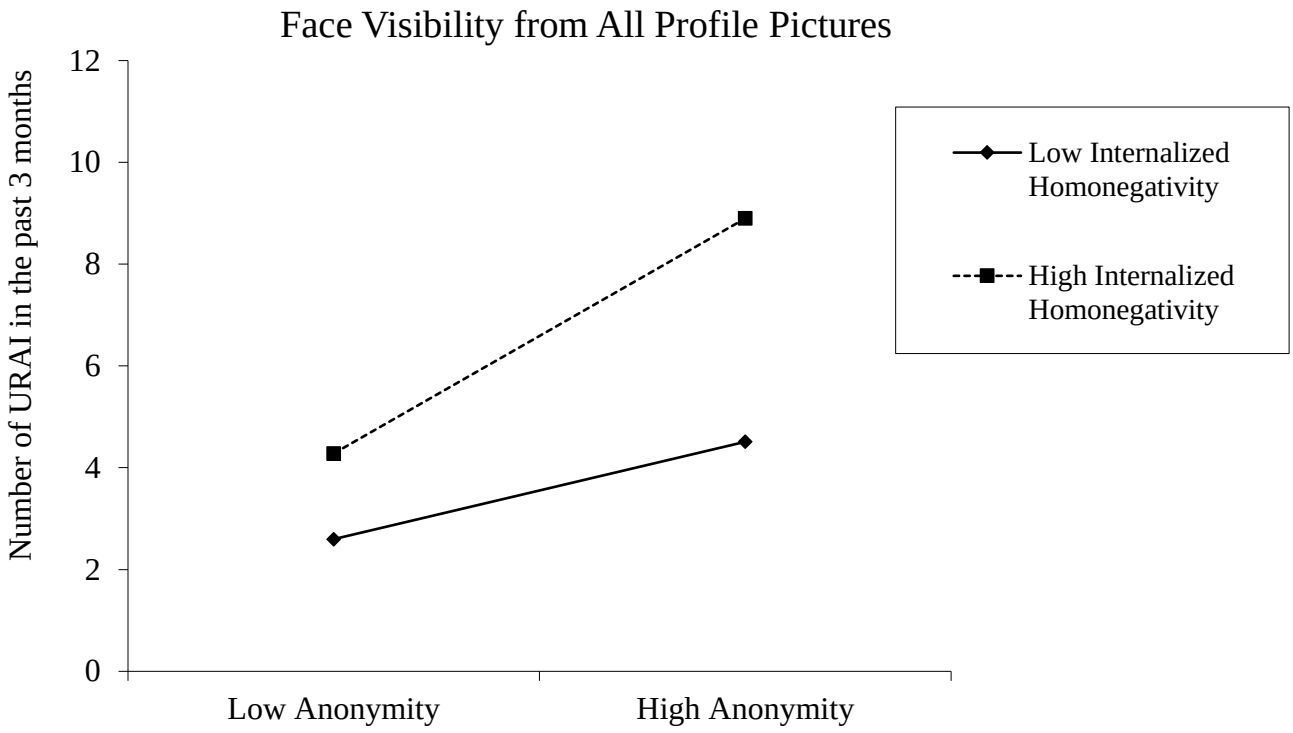

Figure 2. Interaction between participants' face visibility in general from all profile pictures in the past three months (higher scores = more anonymous) and internalized homonegativity. DV = number of URAI (unprotected receptive anal intercourse) in the past three months.

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