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Difference in New Product Adoption Among At-Risk Members of Society: A Critical Analysis of Male, Female, and Transgender Individuals

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Abstract

The study examines how fear and embarrassment associated with the usage of a new product influence product adoption. The extant body of work on individual differences is largely based on educated, relatively wealthy individuals in industrialized countries. This study extended prior work by exploring the uptake of a new product among 1823 at-risk individuals including sex workers and drug users from countries with high HIV prevalence. The findings show that fear of contracting HIV encouraged new product adoption while embarrassment associated with taking the new product hindered it. It is noteworthy that embarrassment is a better predictor than fear. Critically, the effect of embarrassment differed across genders. Specifically, embarrassment plays a more important role for transgender and female individuals compared to males. The effects are driven by public and private embarrassment in sub-Saharan and non-sub-Saharan countries, respectively. This study thus contributes to the important work on sexuality, gender differences, fear, embarrassment, and the uptake of new products for high-risk or stigmatized members of marginalized communities. The findings also offer practical implications for communication strategies to facilitate the uptake of new products such as a new medicine among members of stigmatized communities, less wealthy, and less educated members of society.

Keywords: fear, embarrassment, PrEP, HIV, sexuality, transgender, adoption, sub-Saharan countries

1. Introduction

The human immunodeficiency virus (HIV) continues to be a serious global health challenge with approximately 1.8 million people becoming newly infected in 2017 (WHO, 2018). One way of preventing the spread of HIV is through oral, topical, or parenteral pre-exposure prophylaxis (PrEP), an antiretroviral medicine purported to reduce the risk of contracting HIV by up to 99% (Matthews-King, 2018). Despite its efficacy, PrEP uptake has been slow since its FDA approval in 2012 (Eaton, Driffin, Bauermeister, Smith, & Conway-Washington, 2015). One challenge is related to awareness, while other barriers to adoption relate to fear and embarrassment of taking this new medicine. Specifically, only 27% of young homosexual men in a cross-sectional survey were aware of PrEP (Bauermeister, Meanley, Pingel, Soler, & Harper, 2013), and only 28% of primary care providers surveyed felt familiar with prescribing PrEP (Petroll, Walsh, Owczarzak, McAuliffe, Bogart, & Kelly, 2017). To address this lack of awareness, our research ascertains the perceived barriers to PrEP adoption by highlighting how fear and embarrassment affect new product adoption. Importantly, we study gender differences and country differences as part of our analysis of how fear and embarrassment may influence new product uptake. Specifically, this study considers the effects of fear, and embarrassment on PrEP adoption across various gender identities in both sub-Saharan and non-sub-Saharan high HIV-risk countries. A notable contribution of our study is the sample that we use in our research. We complement and extend the existing body of work on sexuality, gender differences, fear, embarrassment, and the uptake of new products for high-at risk or stigmatized individuals. By studying individuals who are often underrepresented in academic research, namely stigmatized groups of people, less wealthy, less educated members of society across the world and identifying gender differences in the effects of fear and embarrassment on PrEP adoption among members of high-risk communities such as male and female sex workers and drug users, we aim to better inform sexual health communications that often use various emotions to promote preventive sexual behavior.

1.1. Fear

Fear is widely used in health communications to evoke behavioral change (Witte & Allen, 2000),

ranging from the Grim Reaper to warn the public of the fatal effects of HIV to graphic images of lung cancer on cigarette packs. Such research assumes that emotions have a functional purpose, facilitating adaptions to problems related to social and physical survival (Keltner & Gross, 1999; Eisingerich, Chun, Liu, Jia & Bell, 2016). By evoking emotions like fear, such health messages hope to evoke the unique coping mechanisms associated with the specific appraisal tendencies of these emotions to foster behavioral change. (Eisingerich et al. 2012; Lerner & Keltner, 2001).

Defined as an unpleasant emotion triggered by negative and uncertain events, fear promotes precautionary and self-protective actions (Frijda, Kuipers, & ter Schure, 1989). Correspondingly, fear is often evoked in health communications by presenting a threat (e.g. HIV) to which the audience is susceptible (e.g. unprotected sex increases your risk of HIV) and severe (e.g. AIDS is fatal) in an attempt to promote protective action (e.g. PrEP adoption) (Witte, Meyer, & Martell, 2001).

Despite its widespread use in health communications, fear can backfire (e.g. Beck, 1984; Keller & Block, 1996; Mongeau, 2013; Ruiter, Kessels, Peters, & Kok, 2014), eliciting defensive reactions such as risk denial, biased information processing, and less attention to health-promotion messages (Green & Witte, 2006; Kok, Bartholomew, Parcel, Gottlieb, & Fernández, 2014). To explain these boomerang effects, drive theories posit an inverted U-shaped relationship between fear and behavioral change, with low to moderate levels of fear driving protective actions, and high levels of fear resulting in avoidance (Hovland, Janis, & Kelley, 1953; Janis & Feshbach, 1953). Similarly, Protection Motivation Theory (PMT; Rogers, 1983) and Extended Parallel Process Model (EPPM; Witte, 1992) postulate that varying appraisals of fear appeals explain these boomerang effects. These theories posit that fear instigates threat appraisals (i.e. individuals' perceptions of threat severity and personal susceptibility) and coping appraisals (i.e. the belief that the recommended behavior will be effective in mitigating the threat - response efficacy, and that one is capable of performing the recommended behavior - self-efficacy). While high self and response efficacies encourage adaptive responses (e.g. condom usage; Abraham, Sheeran, & Abrams, 1994), high severity and susceptibility backfire and elicit defensive responses (e.g. reducing safe sex intentions; van der Velde & Van der Pligt, 1991)

(Ruiter et al., 2014; Witte & Allen, 2000).

Together, these theories suggest that self and response efficacies underlie the effectiveness of fear in health communications. Thus, it is unsurprising that fear often backfires in "audiences (that) do not believe they are able to effectively avert a threat" (Witte & Allen, 2000; p.606). Fear-inducing interventions were associated with lower increases in HIV knowledge and condom use, especially in populations of high HIV incidences (Earl & Albarracín, 2007). Given that the cost of PrEP is prohibitively high, the same issue could plague PrEP campaigns, especially among at-risk individuals. Therefore, while we expect that fear increases PrEP adoption, the role of other emotions to enhance the effectiveness of fear must be considered.

1.2. Embarrassment

Weak correlations between fear and behavioral change across several meta-analyses, r =.15 (Witte & Allen, 2000), r =.21 (Boster & Mongeau, 1984), r=.20 (Mongeau, 1998) corroborates a need to examine other emotions in health communications. While the aforementioned theories explain the effects of fear in health communications, the same appraisals could also evoke other emotions. For instance, Nabi and Myrick (2018) found that hope was associated with self-efficacy in fear appeals. Given the taboo nature of sexual behavior, perceived susceptibility to sexual diseases could also elicit embarrassment. Qualitative research shows that embarrassment is a crucial emotion when it comes to sexual health (van Teijlingen, Reid, Shucksmith, Harris, Philip, Imamura, & Penney, 2007), inhibiting condom use (Bell, 2009), and lowering acceptance rates for chlamydia screening (Balfe, Brugha, O'Donovan, O'Connell, & Vaughan, 2010).

Embarrassment is defined as an emotion that occurs when social norms are violated (Edelmann, 1987; Miller & Leary, 1992; Dahl, Manchanda, & Argo, 2001) in public (when appraised negatively by others) and in private (when one appraises oneself and violates one's self-concept) (Krishna, Herd & Aydinoğlu, 2015). Correspondingly, public embarrassment pertains to a concern for one's public image, as appraised by others while private embarrassment relates to negative self-appraisals and

violations of personal standards (Krishna et al., 2015). Thus, individuals who feel public embarrassment often try escaping social situations to avoid other-appraisals (Leary & Kowalski, 1995). For instance, individuals more likely to avoid purchasing condoms in the presence of others than alone (Dahl et al., 2001). Conversely, private embarrassment is less concerned about social judgment and characterized by greater self-awareness (Krishna et al., 2015). Thus, individuals who feel private embarrassment are more concerned with their self-concept and feel less embarrassed when purchasing Viagra for pleasure than for impotence (i.e. a purpose that is detrimental to self-concept) (Krishna et al., 2015). Given that PrEP adoption could disclose one's private sexual behaviors, it could be a source of public and private embarrassment. Hence, we expect embarrassment to impede PrEP adoption.

Although meta-analyses revealed no gender differences in embarrassment (Else-Quest, Higgins, & Morton, 2012), men and women adopt different coping strategies. When faced with the embarrassing task of acquiring condoms, men were more likely to buy from male cashiers while women masked condom purchase with additional items (Arndt & Ekebas-Turedi, 2016). These findings suggest that genders cope with the embarrassment of sex-related consumption differently. With existing research reliant on cisgender samples, there is a need to ascertain how embarrassment affects transgender individuals. Moreover, due to heteronormative attitudes, transgender individuals are often embarrassed when seeking sexual health services (Albuquerque et al, 2016). Therefore, addressing embarrassment is imperative in PrEP communications where fear might backfire for transgendered individuals who are most at-risk.

1.3. The present research

This study aims to examine how fear and embarrassment affect PrEP adoption among at-risk individuals. Since studies showed no gender differences in acceptance of fear appeals (Witte & Allen, 2000), we hypothesize that fear increases PrEP adoption across all genders (Hypothesis 1). While we expect embarrassment to decrease PrEP adoption (Hypothesis 2), the study will identify gender differences by comparing male, female, and transgender individuals. The desire to conceal

information on PrEP adoption from partners suggests that people could be avoiding social judgment, for example for individuals from sub-Saharan countries. Using concealment as a proxy for public embarrassment, we examine private vs public embarrassment impeding PrEP adoption, and how it differs between sub-Saharan countries and non-sub-Saharan countries. Fig. 1 shows the conceptual framework.

2. Method

2.1. Data collection

Funded by the *Bill & Melinda Gates foundation*, we commissioned the international market research company Ipsos MORI to coordinate and supervise the fieldworks, which were conducted by experienced local market research companies. The fieldworkers had rich experience interviewing the selected populations and were trained face-to-face.

1823 participants (1122 females; 22 transgenders) from eight different countries with high HIV incidence, including Thailand, Ukraine, India, Peru, South Africa, Botswana, Uganda, and Kenya were included. 35% of the participants were aged between 19-24 and 25.3% were aged between 25 and 30. Participants were the potential user groups for PrEP, including sex workers, injecting drug users, young women, men who have sex with men, and serodiscordant couples. Questionnaires were translated in 16 languages by the local market research teams and back-translated by professional translators for content consistency. The final translation was agreed by consensus. Questionnaires were administered in the participants' native language.

The ethical review of this study was approved by the ethical committee of Imperial College London; Comite Institucional de Etica (CIE); Universidad Peruana Cayetano Heredia (Peru); The Committee of Professional Ethics of the Sociological Association of Ukraine (SAU); Director General Health Services Ministry of Health (Uganda); Health Research and Development Division, Ministry of Health (Botswana); Human Research Ethics Committee (Medical), University of Witwatersrand, Johannesburg (South Africa); and Independent Ethics Committee (IEC), Bangalore (India). All participants received informed consent and a brief description of product attributes,

highlighting routes of administration, side effects, and the need for subsequent health tests. It was stressed that the product was still being tested and its attributes remained uncertain. All participants completed the anonymous questionnaire within 20 min and were offered a monetary incentive, except in South Africa, as required by its ethical committee.

2.2. Measures

Participants were asked to answer a questionnaire about their attitudes towards PrEP adoption despite significant purchase barriers, including potential side-effects, cost, uncertain product efficacy, and associated social stigma associated. Pertinence and clarity of the questionnaire wording were checked with local researchers in a focus group.

Fear and embarrassment were measured with the following questions, "How afraid are you of contracting HIV/AIDS, if at all?" and "How embarrassing, if at all, would you find it to take PrEP?" on four-point Likert scales anchored at "*not at all/very*". Participants were also asked "Would you want your partner or partners to know if you were taking PrEP, or not?" on a five-point Likert scale "*No, definitely not/Yes, definitely*". As public embarrassment is concerned with social judgment (Krishna et al., 2015), individuals would conceal sensitive information from partners. Thus, response to this question was reverse coded. Higher scores indicated greater concealment and thus greater public embarrassment.

Participants indicated their willingness to adopt PrEP (e.g. adopt the product / adopt the product immediately when available) given different conditions (e.g. side effects, regular HIV/AIDS test required, monetary cost, using condoms required, non-100% of effectiveness) on four-point Likert scales anchored at "*No, definitely not/ Yes, definitely*". These six items were averaged to form a total adoption score (α=.81).

Risky sexual and drug-taking behaviors were included as control variables. Risky sexual behavior was measured by the number of sexual contacts, and frequency of unprotected sex (e.g. van Lankveld,

Platteau, van Montfort, Nieuwenhuijs, & Syroit 2015; Birthrong & Latzman, 2014). Since the sample included sexual workers, we did not use the number of sexual partners as an indicator and relied on responses to "In the last month, how often have you used condoms with your sexual partner or partners". The variable is reverse-coded. A high score indicated greater risky sexual behavior. As drug-taking typically reflects risky behavior (e.g. van Lankveld et al., 2015), it was measured using the question, "In the last month, how many times have you used injecting equipment that is not clean or has been used before, for example, a used needle." A high score indicated greater risky behavior.

Age was measured in 11 age groups with different ranges (e.g. "16-18", "19-24"). Gender was measured as male, female, or transgender. Male was dummy-coded as male =1 and female= 0; Female as male=0 and female =1; Transgender as male=0 and female=0.

3. Results

3.1. Embarrassment and fear

Table 1 showed the descriptive results and correlation between different variables. A hierarchical multiple regression was conducted to test the effect of fear and embarrassment on PrEP adoption. In step one, age, risky sexual behavior, and drug-taking were entered as control variables, and this explains 4% of variance in PrEP adoption. In Step Two, fear was entered and explained a significant additional 2% of variance in PrEP adoption. In the final model, both fear and embarrassment were entered, and explained a significant additional 7% of variance in PrEP adoption. The final model explained 13% of variance in PrEP adoption. Coefficients can be seen in Table 2. In the final model, variables of age, risky sexual, fear, and embarrassment significantly predicted PrEP adoption.

The results indicate that older people were more likely to adopt PrEP. High risk behaviors (i.e. risky sexual behavior) reduced PrEP adoption. In line with Hypothesis 1 and 2, fear increased willingness to adopt PrEP, while embarrassment reduced it. As we expected, embarrassment was a better predictor than fear as it explained great variance in PrEP adoption.

3.2. Gender differences

To test if gender (male, female, transgender[1]) moderated the effect of embarrassment on PrEP adoption, a regression was performed on PrEP adoption with independent variables embarrassment, two dummy variables for three types of genders and their interaction. The result showed significant two-way interactions. To explore the interaction, we examined the slopes of embarrassment for different genders. The slope of embarrassment is negative and significant for all male, female, and transgender individuals (Table 3). The negative effect is stronger for transgender individuals than females and males.

In addition, a spotlight analysis at one standard deviation above the mean of embarrassment showed a difference between different genders. Highly embarrassed males were less likely to adopt PrEP rather than highly embarrassed transgender (B=-0.57, SE=0.26, t=-2.20, p=.03) and females (B=-0.22, Se =0.10, t=-2.07, p=.04)) individuals; females show no difference with transgender individuals (B=-0.36, SE= 0.26, t=-1.38, p=.17). A similar spotlight at one standard deviation below the mean of embarrassment showed a significant difference such that lowly embarrassed transgender individuals were more likely to adopt PrEP rather than males (B=0.14, SE=0.08, t=1.85, *p*= .07) and females (B=0.13, SE=0.08, t=1.77, *p*=.08); there is no difference between males and females (B=0.01, SE= 0.05, t=.21, p=.83). Fig 2 visualizes the results.

3.3. Mediating effect of concealment and cross-country difference

Descriptive results (Table 4) showed significant differences in PrEP adoption, partner concealment, and embarrassment between sub-Saharan countries and others such at sub-Saharan people show more embarrassment, high willingness to inform partners, and less willingness to adopt PrEP. Regression results (Table 5) showed significant two-way interaction between embarrassment and countries.

To further examine if country moderated these effects, a moderated mediation with 5000 bootstrap

[1] as our transgender sample is mainly from India, we use Indian sample for such an analysis.

iterations was conducted to test the relationship of embarrassment by country on PrEP adoption through the mediator of partner concealment (Hayes, 2017; model 8). While the direct effect indicates that embarrassment negatively predict PrEP adoption for all countries, the effect of embarrassment is mediated by partner concealment only for sub-Saharan countries but not for non-sub-Saharan countries (Table 6). The desire to conceal information on PrEP adoption from partners suggest that people from sub-Saharan countries could be avoiding social judgment. In other words, public embarrassment could be impeding PrEP adoption. Conversely, individuals from other countries could be hindered by private embarrassment as partners concealment did not mediate the effects of embarrassment on PrEP adoption (Table 6).

4. Discussion

4.1. Conclusion and implications

Despite being purported as a means to ending the HIV epidemic, the PrEP drug has yet to be widely adopted. This begets the question: How can we encourage PrEP adoption, especially among high-risk individuals? Our study addresses this issue by examining how emotions affect PrEP adoption in eight countries with high HIV prevalence. In line with our hypotheses, fear increases willingness to adopt PrEP while embarrassment decreases it. Interestingly, our study also reveals significant gender differences and cross-country differences. Specifically, transgender and female individuals were more affected by embarrassment, compared to their male counterparts. Moreover, decreased PrEP adoption was driven by public embarrassment for individuals from sub-Saharan countries while individuals from non-sub-Saharan countries were mostly driven by private embarrassment.

These insights not only broaden our understanding of how emotions influence preventive sexual behavior across genders and countries, but also better inform the design of health communications. While fear could promote PrEP adoption, fear tactics often backfire among at-risk individuals who believe that they cannot avert the risk (Kok et al., 2018; Witte & Allen, 2000). Our research shows that these effects could be partly driven by embarrassment. Thus, it is imperative to provide remedies for embarrassment as it reduces PrEP adoption especially among transgender and female individuals.

Furthermore, these remedies need to take into account that different forms of embarrassment impede PrEP adoption across countries. Accordingly, while personal and undisclosed modes of purchase could help individuals avoid public embarrassment, purchasing purposes that boost self-concept could assist users from sub-Saharan countries in averting private embarrassment.

4.2. Limitations and future research

Our findings are subject to several limitations. First, the study relied on self-reports to measure emotions and sexual behavior. Given the taboo nature of sexual behavior, promiscuity, or drug usage these reports might be subject to a degree of social desirability (e.g., respondents not indicating accurate number of sexual contacts, or frequency of unprotected anal sex, drug usage such as heroin, cocaine, methamphetamine, etc.). Also, given the large-scale global data collection process and the fact that data was collected in non-traditional settings such as brothels, street corners, clubs, etc., we do not have resources to adopt long scales for some measurement. Secondly, these relationships were demonstrated by theoretical inference and survey data. It is also possible that PrEP adoption induces fear and embarrassment. Thus, future research could adopt experimental methods to illustrate a causal relationship between these emotions and PrEP adoption, as well as examine if these effects could extrapolate to other HIV preventive behaviors. Thirdly, our findings were based on a small number of transgender individuals. Hence, examining the gender differences in embarrassment in a larger group of transgender individuals, particularly across countries, may merit future exploration.

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Figure 1 Conceptual framework

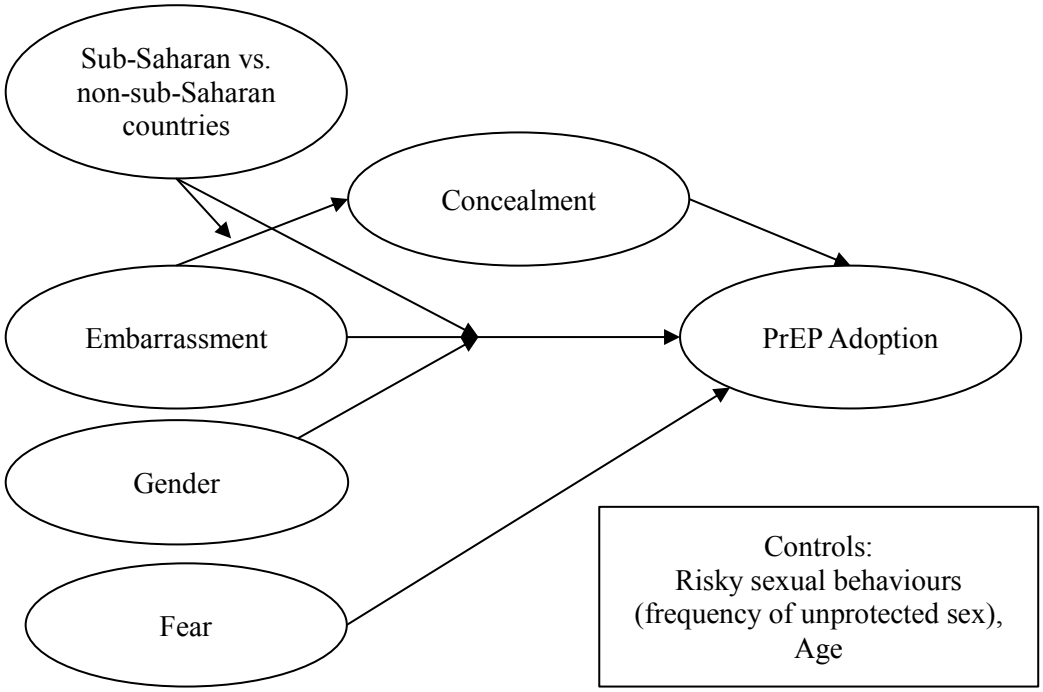

Figure 2 Embarrassment predicting adopting behaviour among genders

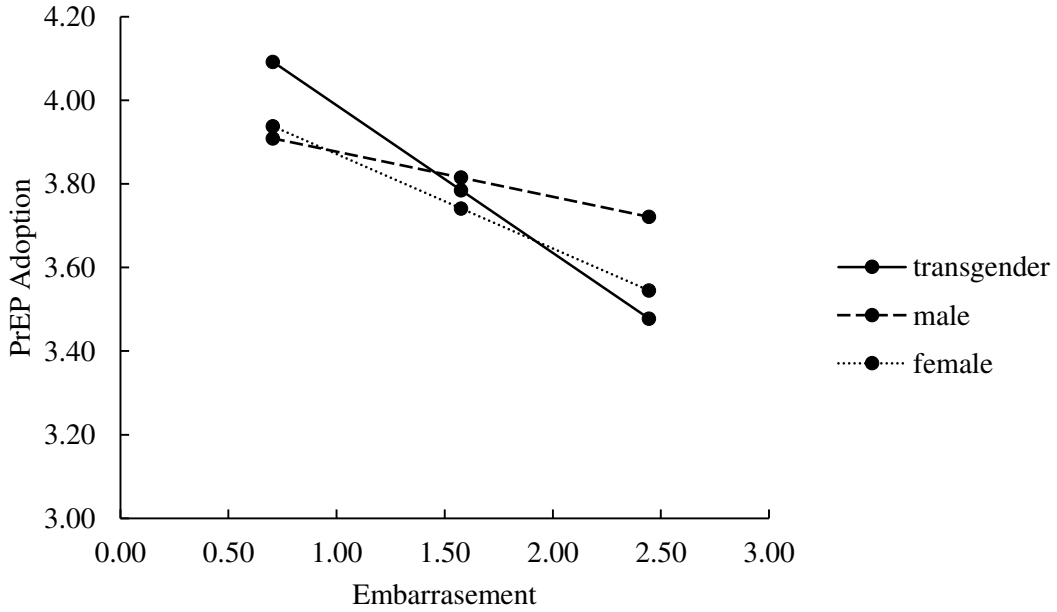

Table 1. Descriptive results

			Correlations					
	M	SD	1	2	3	4	5	6
1. adoption	3.39	0.60	-					
2. age	-	-	.12***	-				
3. risky sexual behaviour	1.85	1.16	-.16***	-.07**	-			
4. drug-taking	1.10	0.42	-.05*	-.02	.10***	-		
5. fear	3.48	0.83	.14***	-.02	.00	-.05*	-	
6. embarrassment	1.50	0.84	-.27***	-.12***	.05*	-.01	.01	-

* p<.05; ** p<.01; *** p<.001.

Table 2. Regression analysis predicting adopting behaviour from fear and embarrassment

Predictors	Step 1		Step 2		Step 3	
	Beta	t	Beta	t	Beta	t
Age	.10	4.26***	.11	4.39***	.08	3.44***
Risky sexual behaviour	-.16	-6.44***	-.16	-6.55***	-.15	-6.25***
Drug-taking	-.04	-1.46	-.03	-1.12	-.03	-1.37
Fear			.14	5.65***	.13	5.79***
Embarrassment					-.27	-11.41***
	ΔR^2=.04		ΔR^2=.02		ΔR^2=.07	
	$\Delta F(3, 1614)=23.08^{***}$		$\Delta F(1, 1613)=31.96^{***}$		$\Delta F(1, 1612)=130.09^{**}$	

** p<.01; *** p<.001. DV=PrEP adoption

Table 3. Summary of embarrassment predicting adopting behaviour among genders.

	B	Std. Error	*t*
Transgender	-.35	.12	-3.03**
Female	-.23	.03	-8.56***
Male	-.11	.03	-3.70***

** p<.01; *** p<.001.

Table 4. Descriptive difference between sub-Saharan and non-sub-Saharan countries

	Sub-Saharan countries			Other countries			
	N	M	SD	N	M	SD	*t*
Adoption	1044	3.31	.58	780	3.50	.60	-6.69***
Partners concealment	1044	4.12	1.22	780	3.72	1.43	6.37***
Embarrassment	1025	1.61	.90	773	1.34	.72	7.0***

***p<.001; Sub-Saharan counties are South Africa, Botswana, Uganda, and Kenya; Other countries are Thailand, Ukraine, India, and Peru.

Table 5. Regression results predicting PrEP adoption from embarrassment between sub-Saharan and non-sub-Saharan countries

Predictors	DV=Partner concealment			DV= PrEP adoption		
	B	Std. Error	***t***	B	Std. Error	***t***
Partner concealment	-	-	-	.15	.01	14.82***
Embarrassment	-.03	.06	-.47	-.07	.03	-2.69**
Country (sub-Saharan vs non-sub-Saharan countries)	.98	.12	7.71***	-.07	.05	-1.26
Embarrassment × country	-.36	.08	-4.57***	-.10	.03	-2.99**
	$R^{2=}$.07			R^2 =.19		
	F (3, 1794)=39.35***			F (4, 1793)=107.56***		

*** p<.001; ** p<.01.

Table 6. Conditional direct and indirect effects of embarrassment on adoption

	Direct effect			Indirect effect via partners concealment		
	Effect	Std. Error	t	Effect	Std. Error	Confidential Interval
Non-Sub-Saharan countries	-.07	.03	-2.69**	-.00	.01	(-.03, .01)
Sub-Saharan countries	-.17	.02	-8.94***	-.06	.01	(-.07, -.04)

*** p<.001; ** p <.01.