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APPLICATION OF THE THEORY OF PLANNED BEHAVIOR TO EXPLAIN MEDIA EXPOSURE AND CONDOM USE AMONG GHANAIAN YOUTH

A Thesis in

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ABSTRACT

This study uses the National Survey of Adolescents in Ghana (2004) to examine the relationship between media exposure modality and frequency and condom use at actual intercourse among adolescents age 12-19 in Ghana (n=368). Specifically, this study applies the Theory of Planned Behavior (TPB) to explain condom use. Using the TPB as the guiding framework, multinomial logistic regression is used to analyze the relationship between modality of media exposure and actual behavior. Multinomial logistic regression is also used to examine whether frequency of exposure to different media modalities significantly predicts actual condom use. This study contributes to the existing literature by using the TPB model to examine the predictive relationship between media exposure and condom use among adolescents ages 12-19 in Ghana. Limited research exists examining the relationship between media exposure and condom use in Ghana; additionally, the TPB has not been used to predict condom use using media exposure frequency and modality as predictors in the Ghanaian population. Findings from the present study suggest the odds of condom use are greater among individuals exposed to HIV prevention messages on television and print than the odds of condom use among unexposed individuals. Additionally, greater frequency of exposure to television significantly increases the likelihood of condom use among exposed versus unexposed individuals. Findings from the present study inform public health and community-based educators of viable points of entry to target increased condom use among adolescents and reduce HIV transmission among this age cohort.

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Chapter 1

Introduction

Statement of the Problem

The purpose of this study is to examine the effects of HIV/AIDS prevention media campaigns on condom use among adolescents age 12-19 in Ghana. In 2008, Ghana's HIV prevalence was 1.9 percent (Epidemiological Fact Sheet on HIV and AIDS, 2008). In 2006, HIV prevalence among teenagers ages 15-19 was 1.4 percent (Ghana, 2006-2007). The HIV prevalence among teenagers ages 15-19 increased from 0.8 percent in 2005 to 1.4 percent in 2006. In 2001, only 24 percent of sexually active men from age 15-59 reported using a condom at last intercourse. Among women, only 12 percent of sexually active women from age 15-49 reported using a condom at last intercourse (Tweedie, Boulay, & Fiagbey, 2003). Because 45 percent of new HIV infections occur among individuals age 15-24, prevention in the early years of sexual activity can help reduce the incidence of HIV infections among this young cohort.

Background

HIV/AIDS Prevalence in Ghana

In Ghana, 60 percent of the total population is below 18 years of age (National Report on the Progress of the United Nations General Assembly Special Session UNGASS of Commitment of HIV and AIDS, Ghana, 2006-2007). HIV prevalence in Ghana has remained around 3.4

percent between 2001 and 2006 (Ministry of Health, 2008). A third of all new infections reported through antenatal clinics between 2001 and 2006 occurred among women from age 15-24; HIV prevalence among this population ranged between 1.9 percent in 2005 to 2.5 percent in 2006. The plausible increase in HIV prevalence among this age group suggests the need to strengthen prevention efforts among younger Ghanaians (Ministry of Health, 2008). Findings from the 2003 DHS suggest close to 50 percent of women and 27 percent of men reported having had their first sexual experience by age 18, early HIV prevention efforts targeting adolescents during their first years of sexual activity can potentially avert new HIV infections.

Biological and Cultural Risk Factors in Ghanaian Context

Most young individuals enter adolescence HIV negative; because adolescence is a phase of experimentation and engagement in riskier behaviors, youths are at higher risk for HIV transmission (Bertrand & Anhang, 2006). Biological factors also increase the likelihood of young women being infected with HIV. Female youth are more susceptible to cervical ectopy (Family Health International, 2009); cells from the cervical canal that extend onto the cervix are more prone to sexually transmitted diseases, which in turn increase the likelihood of HIV infection. There is partial empirical support for a positive relationship between cervical ectopy and HIV infections (Myer, Wright, Denny, & Kuhn, 2006; Family Health International, 2009).

In addition to biological factors, socioeconomic risk factors affecting Ghanaian adolescents also increase the likelihood of HIV infections (Bertrand, O'Reilly, Denison, et al., 2006). Socio-cultural factors such as the opposition from Traditionalist, Muslim, and Catholic leaders on the uptake of family planning services including condom use negatively influences the

ability of young Ghanaians to protect against HIV infections. Similarly, findings suggest healthcare professionals do not provide family planning and HIV prevention services to adolescents and young women (Ministry of Health, 2007). Nonetheless, several qualitative studies have examined the structural, social, cultural, and economic- factors that increase the risk for HIV infection among Ghanaian adolescents (Ankomah, 1992; Ankomah, 1996; Mill & Anarfi, 2002; Adu-Mireku, 2003).

Studies find childhood poverty and overall poverty to be positively associated with increased risk for HIV (Ankomah 1992; Ankomah 1996; Mill & Anarfi, 2002; Buvé, Bishikwabo-Nsarhaza, & Mutangadura; 2002). Given limited financial resources, girls experiencing childhood poverty were less likely to have attended school when compared to male siblings; girls were also more likely to drop out of school to do house chores or to generate income for themselves (Mill & Anarfi, 2002). Research also shows the importance of transactional sex exchange in the context of Ghanaian youth (The World Bank, 2008; Ankomah, 1992; Ankomah, 1996; Waithaka & Bessinger, 2001). Transactional sexual networking describes relationships where young women exchange sexual intercourse and perform household related chores in exchange for pocket money, fashion accessories, and in some cases, startup capital for petty trading (Ankomah 1992 & 1996; Buvé, Bishikwabo-Nsarhaza, & Mutangadura; 2002). Nevertheless, transactional sexual networking is mutually consensual and should not be interpreted as prostitution (Ankomah, 1992). In a qualitative study of life experiences of HIV positive women, Mill and Anarfi (2002) find that participants who had experienced childhood poverty and had at most attended middle school opted for boyfriends as a means for economic subsistence; in a sense, this finding aligns with the earlier qualitative work by Ankomah (1992 & 1996).

Influenced by structural factors, young age at first sex also increases the likelihood of HIV infection (The World Bank, 2008). While findings from the 2003 Ghana Demographic and Health Survey (GDHS) show no clear relationship between age of sexual debut and HIV prevalence, women who reported first intercourse between 16 and 19 years of age had higher HIV prevalence than women whose first sexual intercourse happened after age 20. For men, HIV prevalence was higher for individuals who reported their first sexual intercourse between ages 18-19 when compared to younger and older counterparts (< 17 and >20).

Additionally, urbanization and modernization may hinder the decline in HIV prevalence (UNAIDS, 2008). With increasing modernization, southern Ghana has had an increase in the acceptance of premarital relationships (Ankomah, 1992). The migration of youth from northern to southern Ghana in search of improved economic livelihoods increases their risk for HIV infection. Finally, popular belief associating condom use with infidelity still exists among young populations in Ghana (Mill & Anarfi, 2002).

Overall, the effect of poverty on increasing the likelihood of transactional sex and urban migration as a means to generate income increases the risk for HIV infections among young adolescents. Socioeconomic barriers affect the likelihood of young Ghanaians to access condoms to prevent HIV infections as well as a family planning mechanism. Additionally, the lack of accessible HIV prevention services to adolescents and young women also increase their risk for HIV infections. Because adolescents and young women have restricted access to HIV preventions services, access to HIV prevention messages through media campaigns can provide these populations with HIV prevention information otherwise unavailable. This study explores the relationship between exposure to HIV/AIDS messages through the media and condom use at last intercourse as a means to prevent HIV infections.

The specific aims of this study are:

Aim 1: To examine the relationship between media exposure and condom use at last intercourse among adolescents ages 12 to 19 in Ghana.

Aim 2: To examine the relationship between media exposure modality and frequency and condom use at last intercourse among adolescents ages 12 to 19 in Ghana.

Prevention media messages and HIV prevention in Ghana

The first national HIV/AIDS prevention campaign "Stop AIDS Love Life" was launched and broadcasted in Ghana in February 2000. Stop AIDS Love Life was developed and through a partnership that included the Johns Hopkins Bloomberg School of Public Health's Center for Communication Programs, the Ministries of Information and Health, Ghana Television, and other stakeholders from the community. Prior to 2000, efforts to address the spread of HIV/AIDS among the Ghanaian population were non-existent and the topic of "HIV/AIDS" was treated as a taboo in society (Tweedie, Boula, & Fiagbey, 2003). A 4-phase media campaign, Stop AIDS Love Life targeted increases in HIV/AIDS awareness, HIV-protective behaviors, and increased compassion and support toward individuals living with HIV/AIDS (JHU Center for Communications Program, 2005). Specifically, "Stop AIDS Love Life" has involved prominent political, religious, and tribal leaders to greater emphasize the importance and relevance of HIV/AIDS prevention nationwide. Evaluation of Phase I of this campaign shows significant increase in condom use from 13 to 24 percent among men in 1998 and 2001, respectively, and from 4 to 12 percent among women in the same time period (Tweedie, Boula, & Fiagbey, 2003). While this campaign significantly increased condom use among the general population, a

maximum of 23 percent of men and 12 percent of women reported using a condom at last intercourse. Given the recent implementation of HIV/AIDS prevention campaigns in Ghana, limited research exists regarding the effectiveness of these campaigns in generating behavior and attitudinal change among the Ghanaian population. In addition to studies conducted through the JHU Center for Communications Programs on Stop AIDS, Love Life, scant research exists on the effectiveness of media exposure on behavior and attitudinal change.

Excluding the evaluations associated with Johns Hopkins University and the Stop AIDS, Love Life campaign, only one other study has examined the relationship to media exposure not constrained to one specific media campaign and its effect on participants' behavioral outcomes in Ghana. Benefo (2004) found that mass media exposure significantly increased condom use and partner fidelity. No behavioral effects were found on delaying age of first intercourse, abstinence, and avoidance of commercial sex. The present study contributes to the current literature by providing greater evidence about the effectiveness of broad media exposure on condom use among Ghanaian adolescents age 12-19.

Exposure to HIV/AIDS Prevention Media Campaign in Africa

Currently, several studies have examined the effectiveness of exposure to media campaigns in generating behavioral changes among the general public and high risk groups (Tambashe, Speizer, Amouzou, & Djangone 2003; Tweedie, Boulay, Fiagbey, 2003; Bertrand, O'Reilly, Denison, Anhang, & Sweat, 2006; Fatusi, Wang, & Anyanti, 2007). A systematic review examining the relationship between media campaigns, HIV/AIDS knowledge, and behavior change shows mixed results regarding the campaigns' effects on perceived self risk of

HIV infections, interpersonal communication about HIV/AIDS and condom use, self- efficacy to negotiate condom use, and abstinence (Bertrand et al, 2006). Nonetheless, this review finds more than half of all studies show positive effects of media campaigns on HIV/AIDS knowledge and a decrease in number of sexual partners, casual sex, and commercial sex.

Other studies have also concluded that campaign exposure positively impacts HIV/AIDS knowledge and awareness (Goldstein, Usdin, Scheepers, & Japhet, 2005; Sood, Shefner-Rogers, & Sengupta, 2006). Having reviewed 17 studies examining the effects of radio and/or TV campaign exposure, Bertrand et al. (2006) find no significant to mixed results regarding changes in condom use among exposed men and women. Contrary to their earlier systematic review, Bertrand and Anhang (2006) re-examine these studies and select only those who meet certain standards for methodological rigor. In this study, they examine the strength of mass media campaigns on HIV/AIDS related behavior among young adults as well as identify the threshold of evidence required to suggest widespread implementation of the HIV/AIDS prevention programs, Bertrand and Anhang (2006) find mass media campaigns increase HIV/AIDS knowledge on transmission, improve self-efficacy regarding condom use, influence social norms, increase interpersonal communication, and increase condom use. In this review, the authors find little support for improved self-efficacy in regard to abstinence, delayed age of first sexual experience, or decreased number of sexual partners.

Findings from studies examining the effectiveness of campaign exposure on behavioral change such as condom use and multiple sex partners are mixed. In an evaluation study of mass media campaigns and HIV/AIDS prevention in Ghana, Benefo (2004) finds a positive impact of mass media campaigns, especially radio, on the likelihood of increasing partner fidelity and increased condom use as potential avenues for HIV prevention. Other studies find a significant

increase in condom use among men and women exposed to the campaign (Tweedie, Boulay, & Fiagbey, 2003; Bessinger, Katende, & Gupta, 2004; Kim, Kols, Nyakaura, Marangwanda, & Chibatamoto, 2001). Bessinger et al. (2004) also find a positive relationship between campaign exposure and knowledge of condoms as a means to prevent HIV/AIDS. On the other hand, Benefo (2004) finds campaign exposure had no effect on abstinence and avoidance of commercial sex among men in Ghana. Similarly, Tweedie, Boulay, & Fiagbet (2003) find age of first sex and multiple sexual partners remained unchanged even among men and women exposed to the campaign. Using a longitudinal study, Sood, Shefner-Rogers, and Sengupta (2006) find campaign exposure to have no effect on condom use among non-regular sex partners and on condom use to prevent STI/HIV transmission. While the findings of Sood, Shefner, and Sengupta (2006) regarding condom use as a means to prevent STI/HIV transmission contradict an earlier study (Bessinger et al., 2006), the small sample size used limits the generalizability of their findings.

Using a pre and post design, Tambashe, Speizer, Amouzou, and Djangone (2003) also find HIV prevention mass campaigns targeting truck drivers in Burkina Faso do not affect condom use at last intercourse with an occasional partner. This study finds billboards and television have no effect on intent to use a condom in the future, on the likelihood of discussing HIV/AIDS with colleagues, and on condom use at last intercourse with an occasional partner.

Studies examining the effectiveness of mass media campaigns in generating change in knowledge, practice, and attitudes also examine the independent effect of each of the media channels on the outcomes of interest. When compared with television, print, and billboards, radio seems to be the most effective method (Meekers & Silva, n.d.; Timbashe et al. 2003; Benefo, 2004; Fatusi, Wang, & Anyanti, 2007-2008).

Research examining the effect of media exposure on increasing condom use predominantly finds a positive relationship suggesting individuals who are exposed to HIV prevention messages through the media are more likely to report having used a condom at last intercourse. Of 24 studies examining the effectiveness of media exposure in motivating change among HIV/AIDS related outcomes only 9 describe the theoretical frameworks used to guide their analyses; the theoretical frameworks presented include Bandura's social cognitive theory, the theory of reasoned action/planned behavior, the steps to behavior change framework, the behavioral change for interventions model, the AIDS risk reduction model, the social learning hierarchy of effects, and the social learning principles of community development (Bertrand et al., 2006).

Chapter 2

Theory and Conceptual Framework

The theory of planned behavior (TPB) has been heavily used to predict intended condom use and condom use at last intercourse in Africa and around the world (Albarracin, Johnson, Fishbein, & Muellerleile, 2001; Bosompra, 2001; Bryan, Kagee, & Broaddus, 2006; Lugoe & Rise, 1999; Godin, Bah, Sow, Minani, et al., 2008). When analyzing the relationship between differing levels of frequency exposure to HIV prevention messages within the media and condom use at last intercourse, prior studies repeatedly find a dose-response effect (Benefo, 2004; Bessinger, Katende, & Gupta, 2004; Goldstein, Usdin, Scheepers, & Japhet, 2005) . Given this study's interest in predicting condom use at last intercourse, the TPB and the dose response theory will be used as guidelines for the conceptual framework.

The TPB and the dose response theories were selected as the guiding framework for the study's two aims, which are to examine: 1) the relationship between media exposure and condom use at last intercourse; and 2) the relationship between modality and frequency of media exposure and condom use at last intercourse. The TPB is used to address Aim 1, suggesting media exposure significantly predicts condom. To examine Aim 2, the theory of planned behavior and the dose-response theory are both used as the guiding framework to suggest increased frequency of media exposure positively affects the likelihood of using a condom at last intercourse. According to the TPB, frequency and modality of media exposure are independently used as a determinant of the behavioral outcome, condom use at last intercourse.

The dose-response theory is used to predict the effect of changes in the frequency of exposure to the media on condom use at last intercourse.

Theory of Planned Behavior

The application of the TPB in the African context has increased in the past ten years (Lugoe & Rise, 1999; Bosompra, 2001; Giles, Liddell, & Bydawell, 2005; Godin, Bah, Sow, et al., 2008). Coined by Ajzen (1986, 1991), the TPB incorporates the determinant of perceived behavioral control into their original Theory of Reasoned Action (TRA, 1967) to predict behaviors where individuals do not have complete volitional control. In addition to perceived behavioral control, the TPB includes attitudes and subjective norms as determinants of behavioral intention and actual behavior. Perceived behavioral control refers to the characteristics of the individual or environment which facilitate or hinder the performance of the behavior, independent of the individual's intention to perform the behavior (Montano & Kasprzyk, 2002). Attitudes refer to an individual's evaluation, positive and negative, of the behavior. Subjective norm refers to an individual's perception of social pressure from important referents (close friends, family, public health campaigns, media) to perform or not perform the behavior (Lugoe & Rise, 1999). Critics of the implementation of the TPB and other social learning/cognitive theories in African contexts argue that theories which target individual psychology oppose the cultural norms where the family, the group, and/or the community greatly influence/control the decision-making process (Airhihenbuwa & Obregon, 2000).

Despite criticism against the implementation of the TPB in Africa, prior research has successfully implemented the TPB and the TRA to predict sexual behaviors, intention to use

condoms, and actual condom use across populations in different countries (Lugoe & Rise, 1999; Bosompra, 2001; Albarracin, Johnson, Fishbein, et al., 2001; Giles, Liddell, & Bydawell, 2005; Boer & Mashamba, 2007; Godin, Bah, Sow, et al., 2008). The significance of predictors in the TPB varies by the population and country of study. Studies using the TPB find any combination of subjective norm, attitudes, and perceived behavioral control to be significant predictors of intended condom use among adolescents and young adults in Tanzania, South Africa, and Ghana (Lugoe & Rise, 1999; Bosompra, 2001; Giles, Liddell, & Bydawell, 2005; Boer & Mashamba, 2007).

Dose- Response Theory

The dose-response theory will be used as the guiding framework to examine the relationship between increased frequency of media exposure and condom use at last intercourse among youth from ages 12-19 in Ghana. Prior research examining levels of campaign exposure suggest a dose-response effect on dependent variables associated with HIV prevention (Adih &Alexander, 1991; Bessinger, Katende, & Gupta, 2004; Goldstein, Usdin, Scheepers, & Japhet, 2005; Kim, Kols, Nyakauru, Marangwanda, & Chibatamoto, 2001).

Suggesting a dose-response effect, Kim et al. (2001) find a positive relationship between increased exposure to diverse media channels and the likelihood of discussing HIV/AIDS, adopting protective behaviors, and seeking services at health centers. Specifically, authors find that increased exposure to launch events, leaflets, posters, and radio directly affects the likelihood of saying no to sex and to adopting continued abstinence as means of protection against HIV/AIDS transmission (Kim, 2001). Bessinger et al. (2004) also find exposure to

multiple channels (radio, TV, posters, and print) to have greater effect on condom knowledge, ever use of condom, and condom use at last intercourse. In their study, the dose-response effect was greatest with knowledge of condoms over ever use of condoms as a means to avoid HIV/AIDS. A different mixed methods study suggests greater exposure to South Africa's Soul City campaign through television, radio, and print improved the likelihood of an individual asking his/her partner to use a condom and of reporting always use of condoms (Goldstein et al., 2005). Goldstein et al. (2005) also find the likelihood of discussing issues regarding HIV/AIDS increases as the level of exposure to the radio campaign increases.

Conceptual Framework

This study will use a modified version of the TPB to examine the relationship between media exposure and condom use at last intercourse among adolescents in Ghana from age 12-19 (Aim 1). The TPB uses theoretical constructs to determine the likelihood an individual will perform a specific behavior. Contrary to the TRA, the TPB assumes individuals have incomplete volitional control over performing the desired behavior (Montaño & Kasprzyk, 2002). Four theoretical constructs are used to predict actual behavior under the TPB model. In this study, media exposure is used to represent the TPB theoretical construct of subject norm. Three items describing exposure to HIV/AIDS messages through the radio, television, and newspaper or magazine are used to represent an individual's level of media exposure (please see Figure 2-1).

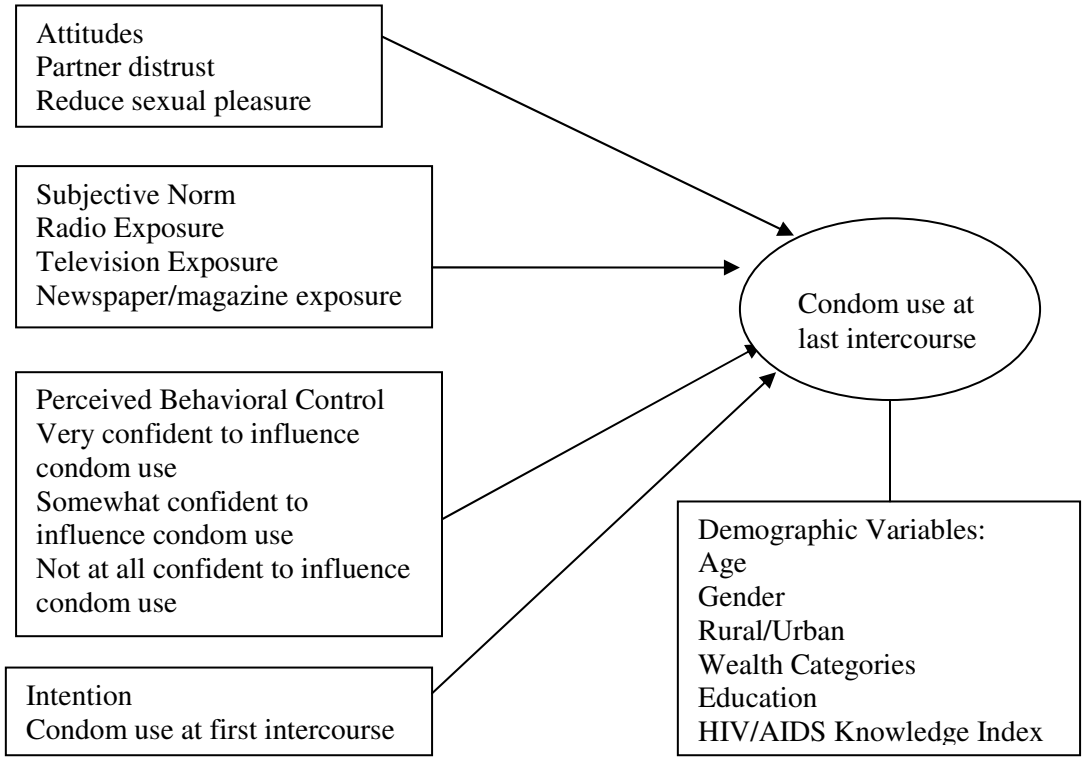
The second construct, attitudes, is measured using two items that describe an individual's attitude toward condom use. The first item asks individuals to agree or disagree with the

statement that using a condom reduces sexual pleasure. Similarly, the second item asks individuals whether they agree or disagree with the statement that using a condom is a sign of not trusting your partner.

Perceived behavioral control, the third theoretical construct of the TPB, is used to predict the likelihood of an individual using a condom given that the act of using a condom is not completely independent of other factors outside the individual's control. This study uses one construct, confidence in ability to influence condom use as a measure of perceived behavioral control. Respondents answer whether he or she feels very confident, somewhat confident, or not at all confident in his/her ability to influence condom use.

Intention is measured through past behavior. Contrary to Azjen (1991) where intention is the most proximate determinant of actual behavior, this study uses intention as another predictor in the model. Because the NSA (2004) in Ghana does not include an item measuring the intention of respondents to use a condom at next intercourse, condom use at first intercourse has been used as a proxy and as a same level determinant as attitudes, subjective norm, and perceived behavioral control. Condom use at first intercourse is used as a proxy for intention. Condom use at last intercourse is the outcome variable (please see Figure 2-1).

Figure 2-1: Application of TPB to explain the relationship between media exposure and actual condom use at last intercourse among adolescents ages 12-19 in Ghana



Prior research on the most effective media communication channels suggests the radio as the most effective means of communication during health campaigns (Goldstein et al., 2005). Using prior research to examine the relationship between frequency exposure to radio, television, and newspapers/magazines suggests the following hypotheses:

H1: Subjective norm positively predicts actual condom use at last intercourse.

H1A: Exposure to HIV/AIDS messages through the radio will predict actual condom use at last intercourse.

H1B: Exposure to HIV/AIDS messages on television will predict actual condom use at last intercourse.

H1C: Exposure to HIV/AIDS messages in newspapers/magazines will predict actual

condom use at last intercourse.

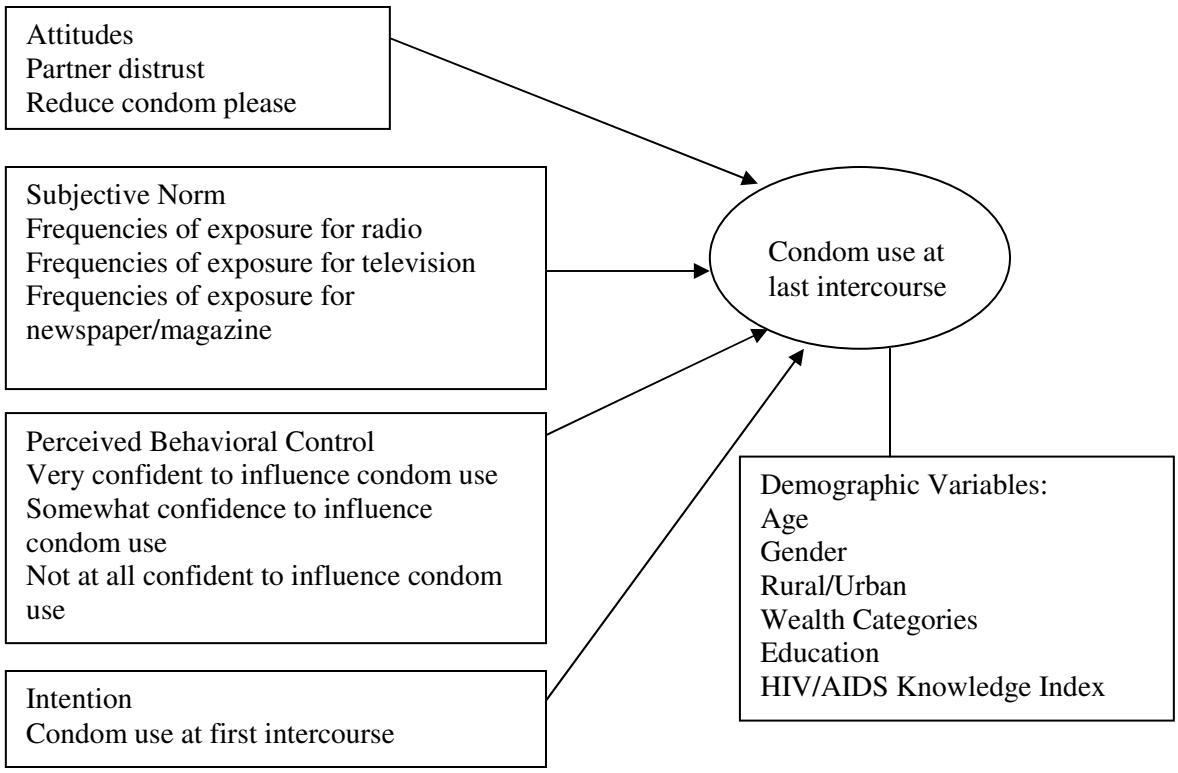
Furthermore, the dose-effect theory is also used as the theoretical framework to examine the relationship between modality and frequency of media exposure with condom use at last intercourse among adolescents from age 12-19 in Ghana (please see Figure 2-2). Research suggests greater frequency exposure to one or multiple media channels is directly related to the outcome occurrence. Applying the dose-effect theory to examine the relationship between modality and frequency of media exposure and condom use at last intercourse suggests the following hypotheses:

H2A: Individuals who have maximum exposure to radio are more likely to use condoms at last intercourse compared to individuals with medium and low exposure to the radio.

H2B: Individuals who have maximum exposure to television are more likely to use condoms at last intercourse than individuals who have least exposure to television.

H2C: Individuals who have moderate exposure to newspapers/magazines are more likely to use condoms at last intercourse than individuals who no exposure to newspapers/magazines.

Figure 2-2: Use of the dose-effect theory to examine the relationship between modality of media exposure and frequency with condom use at last intercourse among adolescents ages 12-19 in Ghana.



Note: The frequencies of exposure per media modality are entered as separate predictors into the hierarchical logistic regression.

Chapter 3

METHODOLOGY

Data

This study uses cross sectional data from the 2004 nationally representative Ghanaian National Survey of Adolescents (NSA) conducted by the Guttmacher Institute, Macro International Inc., and the Institute of Statistical, Social, and Economic Research from the University of Ghana. The NSA in Ghana uses a two-stage stratified sample design; initially, the survey was stratified by enumeration areas and then by households within the areas. Survey data was collected between January and May 2004. A total of 9,445 urban and rural households were selected and interviewed; all eligible respondents ages 12 to 19 who were de jure or de facto members of the household were selected for the individual survey questionnaire, totaling up to 4,430 respondents. Interviews were conducted face-to-face; parent consent forms were requested for respondents younger than 17 years of age.

For the present study, the Institutional Review Board (IRB) approval for the use of a publicly available dataset was obtained from the Office of Research Protection at The Pennsylvania State University. An exempt determination form was submitted by the primary investigator on October 12, 2009 and was approved on October 29, 2009 determining that the current research study is not "human participant" as defined by the DHHS Federal Regulations (S. Hartman, personal communication, October 29, 2009).

Sample

All participants ages 12-19 who were sexually active and responded to the question about whether a condom was or was not used at last intercourse were included in this study. All statistical analyses were conducted using individual sampling weights. As recommended by the Guttmacher Institute, Macro International Inc., and the Institute of Statistical, Social, and Economic Research from the University of Ghana, the "qweight" was divided by 1,000,000 to create a new variable named "weight recode." SPSS option weight cases by "weigh recode" was selected for all statistical analyses (n=368). The unit of observation for this study is the individual.

Measurements

Control Variables

Demographics

Demographic variables for this study include: gender, age, highest level of educational attainment, current place of residence, wealth, and HIV/AIDS knowledge (please see Table 1). Highest level of educational attainment is coded as primary, middle, and secondary. "No formal education" is the reference category. Following suggested guidelines from the WHO (2004), age is divided into two groups: ages 12-14 are coded as 1, and ages 15-19 are coded as 0. Type of residence refers to whether the respondent is currently living in an urban or rural area. Rural area is used as the reference category. Similar to the Demographic and Health Surveys (DHS), the

NSA survey includes a series of asset ownership items used to create a composite measure of wealth. Because no composite wealth index measure is present in the NSA, it was necessary to create a measure of wealth to use as a control variable in the logistic regression. Prior research has used principal component analysis to create a wealth index based on key factors regarding asset ownership and housing characteristics (Filmer & Pritchett, 2001; Rutstein & Johnson, 2004; Vyas & Kumaranayake, 2006; Kabiru & Ezeh, 2007; Madise, Zulu, & Ciera, 2007; Measure DHS, 2009). While the 2004 Ghana NSA does not create a wealth variable as the DHS, this survey contains most of the asset ownership questions used in the DHS (please see Table 3-1). The only exceptions are questions regarding roofing characteristics and the number of household members per sleeping room. The NSA has no observations regarding the materials used for the roof. Currently, the choice of items to be included in the principal component factor analysis used to construct a wealth index is viewed as arbitrary (Vyas & Kumarayanake, 2006; Montgomery, Gragnolati, Burke, et al., 2000).

This study follows the DHS Wealth Index (Rutstein & Johnson, 2004) and Filmer and Pritchett (2001) choice of items to create a wealth index measure. First, all the NSA items that overlap with the DHS Wealth Index (Rutstein & Johnson, 2004) were included to compute the wealth index measure. Second, the two items *main cooking fuel biomass (wood/dung/coal)* and *number of rooms in dwelling* that were used in Filmer and Pritchett (2001) and were also available in the NSA were included in the initial wealth index measure (please see Table 3-1).

Table 3-1:

Frequencies for initial items included in the wealth index.

Items	No (%)	Yes (%)
Pipe into residence	322 (87.4)	42 (11.4)
Pipe into public tap	276 (75.0)	87 (23.7)
Inside well drinking water	333 (90.4)	31 (8.3)
Surface water for drinking	298 (80.9)	66 (17.8)
Uses public well	246 (66.7)	118 (32.0)
Other source for drinking water	343 (93.2)	20 (5.6)
Uses traditional pit	200 (54.3)	165 (44.7)
Ventilated improved pit	281 (76.2)	84 (22.7)
Other type of latrine	358 (97.1)	7 (1.8)
Not shared flush toilet	345 (93.8)	19 (5.2)
Earth/dung flooring	337 (91.5)	27 (7.4)
Tile flooring	364 (99.0)	0
Wood, plank flooring	200 (54.3)	165 (44.7)
Palm, bamboo flooring	277 (75.3)	84 (22.7)
Parquet flooring	279 (75.8)	82 (22.2)
Cement flooring	120 (32.7)	241 (65.5)
Carpet flooring	334 (90.8)	27 (7.4)
Other flooring	361 (97.9)	1 (.3)
Electricity	193 (52.4)	170 (46.3)
Radio	84 (22.9)	279 (75.8)
Television	255 (69.2)	108 (29.5)
Bicycle	248 (67.3)	115 (31.2)
Motorcycle	354 (96.0)	9 (2.5)
Car	339 (92.2)	23 (6.3)
Telephone	339 (92.1)	23 (6.3)
No facility available	283 (76.7)	82 (22.2)
Any members own land	145 (39.5)	218 (59.2)
Drinking rainwater	364 (98.7)	0
Main cooking fuel biomass (wood,dung,coal)	21 (5.7)	342 (93.0)
No. of sleeping rooms	2.90^{+} $(2.24)^{\sigma}$	

Note: $^{+}$ mean. $^{\sigma}$ standard deviation

The following paragraphs describe the process used to create a wealth index which categorizes individuals into poor, middle, and rich. First, Pearson correlations were used to test the relationship between predictors (please see Appendix 1). Drinking rain water, uses tile flooring, and other flooring were dropped from further analyses due to no variation. After trying to conduct an initial principal component factor analysis, the determinant was 0 and the matrix was not definitive. To correct for the undefined matrix, items for which the standard deviation was close to zero were removed from further analyses. The following items had low standard deviations: *inside well drinking water, other source for drinking water, other type of latrine, not shared flush toilet, and uses carpet flooring*. Missing cases were treated using listwise deletion. Five cases of multicollinearity existed among predictors (please see Appendix 1). Where multicollinearity existed, one of the variables was dropped. For example, the item w*ood planks flooring* was multicollinear with *household uses traditional pit* (r= 1.000). The item *wood planks flooring* was dropped from further analyses. In the case of *does your household have a refrigerator*, owning a refrigerator was highly correlated with owning a television (r=.669). Because the correlation between these two items is greater than .6, *refrigerator* was dropped from further analyses and *television* was retained. *Palm, bamboo flooring* was multicollinear with ventilated pit (r=1.00), therefore *palm, bamboo flooring* was dropped. *Telephone* was highly collinear with *main cooking fuel* (r= .646), *telephone* was dropped from further analyses. After dropping multicollinear variables, frequencies were used to explore the variance within each item.

Following the PCA procedure used in prior studies, items with low standard deviations were not included in the PCA (Vyas & Kumaranayake, 2006). The following items were dropped from the study due to low standard deviations: *other type of latrine, not shared flush*

toilet, other flooring, rainwater as source of drinking water, carpet flooring, motorcycle/scooter, telephone, and main cooking fuel. Similarly, research suggests dropping unique or lowly correlated items prior to conducting PCA (Wuensch, 2009). The items *inside well drinking water*, *number of rooms occupied in dwelling,* and *any members own land* were dropped from inclusion in the PCA as all significant correlations between these and other predictors were below $r < .20$. The variable *owns a car/truck* had a low standard deviation, but this item was kept in the analyses due to the moderate correlations with other variables included in the wealth index and due to its inclusion in prior research (Filmer & Pritchett, 2001; Rutstein & Johnson, 2004; Vyas & Kumaranayake, 2006).

Thirteen items were entered into the PCA. Using the Kaiser criterion, PCA was conducted to derive the number of components given eigenvalues over 1; PCA was then conducted to create a one, two, three, and four factor solution. Given the existing literature, a one factor solution was deemed optimal and representative of the wealth index (McKenzie, 2003; Filmer & Pritchett, 2001; Vyas & Kumaranayake, 2006; Measure DHS, 2009). For the study's principal component factor analyses, the Kaiser-Meyer-Olkin (KMO) statistic was .408; while the Bartlett's test of sphericity was significant ($p < .001$). According to Leech, Barrett, and Morgan (2008), a KMO statistic less than .50 is inadequate; however, this study proceeds with the analyses given a significant Bartlett's test of sphericity at the $p < .001$. Bartlett's test of sphericity indicates that the variables are correlated highly enough to support the basis for principal factor analysis (Leech, Barrett, & Morgan, 2008). Following the existing literature, the one factor PCA explained 20.19 percent of the total variance. Next, scores were normalized for each of the 13 items included in the wealth index.

Table 3-2:

Factor loadings for 1 component extraction

Items	Factor loadings	Component Score Coefficient Matrix
Electricity	.773	.295
Television	.758	.289
Piped water in residence	.549	.209
No facility available	-.497	-.189
Ventilated improved pit	.434	.165
Owns car/truck	.431	.164
Public well	-.416	-.158
Surface water for drinking	-.351	-.134
Pipe water into public tap	.348	.133
Radio	.216	.082
Traditional pit	-.180	-.069
Cement as main floor	-.163	-.062
Bicycle	-.084	-.032

These factor scores were then multiplied by the component score factor coefficient matrix to compute a new variable named household wealth index. To reduce the variance on the household wealth index, only items with factor loadings greater than .4 were used to compute the new variable. The following equation was used to compute the household wealth index:

hhwealthindex = 0.295*Zscore recelectricity + .289*Zscore rectv+.209 * ZScore pipe water in residence + -.189 * ZScore no facility available + .165* ZScore ventilated pit + .164 * ZScore car + -.158 * Zscore uses public well.

Finally, this study uses Filmer and Pritchett's (2001) cutoffs representing the bottom 40 percent, the middle 40 percent, and the top 20 percent to create wealth distribution categories. Using the household wealth index, cutoffs were selected at the 40 and 80 percentile, therefore

creating the bottom 40 percent, the middle 40 percent, and the top 20 percent (please see Table 3-3). Further analyses will use "poor" as the reference category.

Table 3-3:

Descriptive Statistics for Household Wealth Index by Category

	N	Minimum	Maximum	Mean	Std. Deviation
Poor	162	-1.2517	-.4625	-.777467	.3046174
Middle	130	-.4079	.8131	.224095	.3904307
Rich	69	.8220	2.4710	1.409141	.3287462

HIV/AIDS Knowledge Index

HIV/AIDS knowledge: is measured using five key indicators identified by the World Health Organization (WHO) as determinants of HIV knowledge of transmission among adolescents (WHO, 2004; Bankole, Biddlecom, Guiella, et al., 2007). Used as a control variable, this summative HIV/AIDS knowledge index measures the ability of individuals to correctly identify means of HIV/AIDS transmission and to reject major misconceptions regarding transmission (WHO, 2004; please see Table 3-4). One point was given for correct answers, otherwise 0. The calculated reliability for the HIV Knowledge Index using the study's sample is $\alpha = .69$

Table 3-4:

HIV Knowledge Indicators Among Young People

1. Can the risk of HIV transmission be reduced by having sex with only one faithful uninfected partner?
2. Can the risk of HIV transmission be reduced by using condoms?
3. Can a healthy looking person have HIV infection?
4. Can a person get HIV infection from mosquito bites?
5. Can a person get HIV infection by sharing a meal with someone who is infected?

Source: WHO, 2004.

Independent Variables

Media measures

Our main effect is media exposure. Two measures of media exposure are used to examine the relationship between media exposure and condom use at last intercourse and frequency of media exposure and condom use at last intercourse. First, media exposure is measured through exposure to radio, television, and newspaper/magazine (please see Table 3-6). Three items are used to measure exposure to the different media sources. The first item (radiobinary) states: *In the last few months have you heard or seen a message about HIV/AIDS oin the radio?* Responses were coded as 1= yes, 0= otherwise. The second item (tvbinary) states: *In the last few months have you heard or seen a message about HIV/AIDS on the television?* Responses were coded as 1=yes, 0=otherwise. The third item (newsbinary) states: *In the last few months have you heard or seen a message about HIV/AIDS on the newspaper/magazine?* Responses were code as 1=yes, 0=otherwise.

Secondly, frequency of media exposure was measured using three different categorical items. Initially, the respondent was asked what the maximum frequency with which she heard or watched the radio and television and read the newspapers/magazines. Response choices were almost every day (1), at least once a week (2), less than once a week (3), not at all (4), none, but

heard AIDS/family planning/STI message (5). Initially, these categories were recoded into maximum radio exposure (1=almost every day), medium radio exposure (2=at least once a week), least radio exposure (3 + 5 = less than once a week and none, but have seen HIV/AIDS messages in radio), and no radio exposure (4 = not at all).

After conducting descriptive analysis, response options were recoded given the frequency distribution per media channel (please see Table 3-5). For frequency of radio exposure, maximum and medium frequencies remained as is; least and no radio exposure categories were combined to create one: low radio exposure. Maximum radio exposure is used as the reference category. For frequency of television exposure, all four categories were retained. Least television exposure is used as the reference category. For frequency of newspaper exposure, maximum exposure and medium exposure were combined to create a moderate exposure category. Least and no exposure categories were retained as is; no newspaper exposure is used as the reference category. Each response category is dummy coded (1=yes, 0=otherwise).

Table 3-5:

Descriptive Statistics for Frequencies of Exposure and Modality.

		Radio		Television		Newspaper/magazine	
Exposure Categories		Frequency	%	Frequency	%	Frequency	%
Maximum exposure	Yes	177	48.0	93	25.2	7	1.9
	No	192	52.0	275	74.8	325	88.1
Medium exposure	Yes	110	29.9	101	27.3	43	11.8
	No	258	70.1	268	72.7	288	78.2
Least exposure	Yes	73	19.9	110	29.8	85	23.2
	No	295	80.1	258	70.2	246	66.8
No exposure	Yes	8	2.3	65	17.7	196	53.1
	No	360	97.7	303	82.3	136	36.9
Total		368	100.0	368	100.0	332	90.0*

Note: Missing cases for frequencies of newspaper exposure not imputed. See limitations section.

Attitudes

Two items were used to measure behavioral attitudes toward condom use. The first item used survey respondents' perceptions on whether they believed condom reduces sexual pleasure (please see Table 3-6). The second item refers to whether a condom is a sign of distrust toward the partner. Response choices included agree, disagree, and don't know. The two items have been recoded into 1= agree, 0= otherwise. Don't know responses were coded as disagree, making the estimate of individuals who respond affirmative to these questions a conservative estimate of a negative attitude toward condom use. The calculated Cronbach's alpha for the 3-item attitudes measure using this sample is α=.578.

Perceived Behavioral Control

One categorical item is used to measure respondents' perceived behavioral control (PBC). The item used for PCB states: *How confident are you that you could get a male partner to wear a condom if you wanted him to use one?* for women, and, *How confident are you that you would know how to wear a male condom if you wanted to?"* for males. (NSA, p.20). Response choices included very confident, somewhat confident, and not at all confident. This item was recoded into three separate dummy variables describing the individual's self-confidence to influence male condom use: very confident, somewhat confident, and not at all confident (1= yes, 0= otherwise). Very confident to influence condom use is used as the reference category.

Intention

Intention is measured through past behavior. Condom use at first intercourse was used as a measure predictive of actual behavior (please see Table 3-6). The NSA survey includes one question asking respondents who have self-identified as sexually active whether or not a condom was used at first intercourse (Q705). Response choices included yes, no, refuse to respond, and don't know. Item Q705, condom used during first intercourse, was recoded into CondomDC, a binary variable where 1= yes, 0=otherwise. Don't know and refused to respond were recoded into otherwise.

Outcome Variable

The outcome variable is the likelihood of an individual having used a condom at last intercourse (please see Table 3-6). Condom use at last intercourse (condomlast) is binary coded (1=yes, 0=otherwise).

Table 3-6:

Frequencies of the TPB Predictors and Outcome Variable

Predictors		Frequency	Percent
Condom use at last intercourse	No	231	62.8
	Yes	137	37.2
Subjective Norm			
Radio exposure	No	67	18.3
	Yes	297	81.7
Television exposure	No	134	36.9
	Yes	229	63.1
Newspaper/television exposure	No	275	75.7
	Yes	89	24.3
Attitudes			
Condom use reduces sexual pleasure	No	210	59.0
	Yes	146	41.0
Condom use is a sign of partner distrust	No	198	56.2
	Yes	154	43.8
Perceived behavioral control			
Very confident in condom use	Yes	181	51.3
Somewhat confident in condom use	Yes	61	17.2
Not at all confident in condom use	Yes	112	31.5
Intention			
Condom use during first intercourse	No	267	72.4
	Yes	102	27.6

Note: Sample is weighted

Analysis

Univariate statistics were used to describe the constructs of the Theory of Planned Behavior as well as the control variables used in the study (please see Table 3-6). Bivariate correlations were used to assess the strength of the relationship among predictors (please see Table 3-7). Logistic regression was used to examine the relationship between exposure to HIV/AIDS messages in the media and actual condom use at last intercourse among adolescents from age 12-19 in Ghana. Actual condom used was regressed on two measures of attitudes, one measure of perceived behavioral control, three items of subjective, and one item of intention. Control variables were entered into block 1; independent variables for attitudes, subjective norm, perceived behavioral control, and intention were entered into block 2 of the logistic regression.

Logistic regression is also used to examine the relationship between frequency and modality of media exposure and condom use at last intercourse. A separate logistic regression was used to examine the relationship between frequencies of exposure and condom use at last for each modality of media exposure. Overall, three logistic regressions were conducted to examine the relationship between frequencies and modality of media exposure and condom use at last intercourse among adolescents from age 12-19 in Ghana. Once again, all control variables were entered into Block 1 of the logistic regression. An R^2 and a p-value for the model were obtained; second, all independent variables for attitudes, subjective norm, perceived behavioral control, and intention were entered into block 2 of the regression. All analyses were conducted using the Statistical Package for the Social Sciences (SPSS Windows) Version 17.

Chapter 4

RESULTS

Descriptive Statistics

Ninety-six percent of the sample was between ages 15-19; only 4 percent was 12-14 years. Mean age for respondents was 17.5 years (please see table 4-1). More than 55 percent of the sample resided in rural areas, whereas 44 percent lived in urban areas. Approximately two-thirds of the participants were female. Close to 50 percent reported middle school as their highest level of educational attainment; 30 percent reported primary and 12 percent reported secondary school as their highest level of educational attainment. In terms of wealth distribution, 44 percent of the respondents were in the bottom 40 percent, approximately 35 percent were in the middle percent, and 19 percent were in the top 20 percent (please see Table 4-1). Additionally, an HIV/AIDS summative index knowledge was used to control for knowledge regarding transmission of HIV/AIDS, the index ranged from 0, no knowledge, to 5, maximum knowledge. Mean score for the HIV/AIDS knowledge index is 3.87, indicating most participants can answer at least 3 of 5 questions correctly.

Table 4-1:

Demographic Characteristics of Ghanaian Individuals from Ages 12-19 Reporting Whether a Condom Was Used at Last Intercourse

	Frequency	Percent
Education		
No education	36	9.7
Primary school	110	29.9
Middle school	177	48.0
Secondary school	46	12.4
Residence		
Rural	205	55.7
Urban	163	44.3
Wealth		
Poorest	162	44.8
Middle	130	36.0
Rich	69	19.2
Gender		
Female	248	67.3
Male	120	32.7
Age		
15-19	354	96.0
12-14	15	4.0
HIV knowledge index		
HIV knowledge	3.87[a]	1.05[b]

Note: HIV knowledge is a continuous variable a = μ; b= σ. Sample size varies due to missing cases.

Condom use at last intercourse was significantly correlated with television and newspaper exposure, condom use as a sign of distrust, very confident, somewhat confident, and not at all confident in influencing condom use, and condom use at first intercourse in the expected direction. While not statistically significant, the Pearson coefficient between condom use at last intercourse and radio exposure was in the unexpected direction. Television exposure was significantly and positively correlated with newspaper and radio exposure. Finally, very confident in influencing condom use is significantly and positively correlated with radio, television, and newspaper exposure (please see Table 4-2).

Table 4-2: Correlations Among TPB Predictors and Condom Use at Last Intercourse

	1	2	3	4	5	6	7	8	9	10
1. Condom use at last intercourse	1									
2. Radio	-.004	1								
3. Television	.174**	.361**	1							
4. Newspaper/magazine	.242**	.195**	.279**	1						
5. Condom reduces pleasure	.034	.022	.054	.009	1					
6. Condom as a sign of distrust	-.126*	-.012	.042	-.072	.249**	1				
7. Very confident in influencing condom use	.417**	.125*	.133*	.184**	.089	-.047	1			
8. Somewhat confident in influencing condom use	-.114*	-.130*	-.087	-.101	.046	-.066	-.463**	1		
9. Not at all confident in influencing condom use	-.356**	-.029	-.073	-.116*	-.133*	.103	-.700**	-.308**	1	
10. Condom use at first intercourse	.623**	.017	.127*	.181**	-.009	-.045	.247**	-.044	-.230**	1

Note: **p < .01; *p<.05. N= 349

Results: Aim 1

Odds ratios from the logistic regression suggest media exposure significantly predicts condom use at last intercourse among adolescents from ages 12-19 in Ghana. Overall, the model significantly predicts condom use at last intercourse χ^2 (17, N = 342) 204.875, $p < .001$; total explained variance is 45 percent. The model correctly predicted whether individuals used condoms or not at last intercourse in 82.4 percent of the cases. Upon inclusion of the TPB determinants, R^2 increased from 8.8 to 45 percent. The odds of condom use among individuals who are exposed to HIV/AIDS messages through the television are 2.628 times more than the odds of condom use among unexposed individuals (OR=2.628, CI: (1.129-6.120)). The odds of condom use among individuals who have been exposed to HIV/AIDS messages through newspaper/magazines are 2.378 times more than the odds of condom use among unexposed individuals (OR= 2.378, CI: (1.030-5.493)). Contrary to the expected direction, the odds of condom use among individuals exposed to HIV/AIDS messages through the radio are .365 times less than the odds of condom use among unexposed individuals (OR=.365, CI: (.143 - .930)). Stated differently, individuals who are exposed to the radio are 64 percent less likely than individuals who are not exposed to the radio to use a condom at last intercourse. The direction of the ORs for radio exposure and condom use at last intercourse is the opposite of what was expected given the findings existent in the literature.

A possible explanation for the unexpected sign of the odds ratio of radio exposure and condom use at last intercourse is that individuals who listen to the radio are more likely to reside in rural areas with limited availability and affordability of condoms. A cross tabs using radio exposure on the vertical axis and type of residence area suggests 56 percent of individuals who are exposed to the radio live in

rural areas. For these individuals, access to condoms may be limited when compared to individuals in urban areas. Given the unexpected sign of the odds ratio for radio exposure, these findings partially support hypothesis 1 which states subjective norm positively predicts condom use at last intercourse. In addition to subjective norm, other predictors of the TPB significantly predict condom use at last intercourse. The odds of condom use among somewhat confident individuals were .189 times less than the odds of using condom among very confident individuals (OR=.189, CI: (.074-.482)). Stated differently, somewhat confident individuals are 81 percent less likely than very confident individuals to use a condom at last intercourse. The odds of condom use among not at all confident individuals were .125 times less than the odds of condom use among very confident individuals (OR-.125, CI: (.054-.293)). Stated differently, not at all confident individuals are 88 percent less likely than very confident counterparts to use a condom at last intercourse.

Attitudes, another determinant of the TPB model, partially predict condom use at last intercourse. The odds of condom use among individuals who believe condom use is a sign of partner distrust were .432 times less than the odds of condom among individuals who do not believe condom use is a sign of partner distrust (OR=.432, CI: (.216 - .863)). Stated differently, individuals who believe condom use is a sign of partner distrust are 57 percent less likely than individuals who do not believe condom use is a sign of distrust to use a condom at last intercourse.

Intention, the last determinant of the TPB model, was measured using past behavior as a proxy for intention. The odds of condom use among individuals who report using a condom at first intercourse were 29.165 times more than the odds of using a condom among individuals who did not use a condom at first intercourse (OR= 29.165, CI: (13.166 – 64.604)). Finally, individuals with middle education are significantly more likely to use a condom at last intercourse versus individuals with no education. The odds of condom use among individuals with middle education were 5.996 times more than the odds of

condom use among individuals with no education (OR= 5.996, CI: (1.248 – 28.807)) times more for individuals with middle education when compared to individuals with no education (please see Table 4-3).

Table 4-3:

Odds Ratios Examining the Relationship Between Media Exposure and Condom Use at Last Intercourse

			95% C.I OR	
Predictors	Sig.	OR	Lower	Upper
HIV Knowledge	NS	1.006	.696	1.455
Gender (female is reference category)	NS	1.504	.740	3.059
Age (15-19 is reference category)	NS	2.862	.557	14.690
Residence (Rural is reference category)	NS	.859	.404	1.826
Education (No education is reference category)				
Primary school	NS	4.625	.917	23.327
Middle school	.025	5.996	1.248	28.807
Secondary school	NS	2.550	.409	15.913
Wealth (Poorest is reference category)	NS			
Middle class	NS	.546	.240	1.244
Rich class	NS	.967	.332	2.818
Radio exposure	.035	.365	.143	.930
Television exposure	.025	2.628	1.129	6.120
Newspaper/magazine exposure	.043	2.378	1.030	5.493
Condom use reduces pleasure	NS	1.195	.599	2.384
Condom is a sign of partner distrust	.017	.432	.216	.863
Somewhat confident in influencing condom use (Reference is very confident)	.001	.185	.068	.503
Not at all confident in influencing condom use (Reference is very confident)	.001	.125	.054	.293
Condom use at first intercourse	.001	29.165	13.166	64.604

Note: Weighted sample (N= 342)

Results: Aim 2

This study also examines the relationship between frequency levels of media exposure and condom use at last intercourse. Significant odds ratios for the relationship between the frequency levels of media exposure per modality with condom use at last intercourse support the dose-effect theory used to develop hypotheses 2 of the current study.

Aim 2: Frequency levels of radio exposure

Table 4-4 shows the odds ratios for low and medium radio exposures are not significant. Therefore, hypothesis 2A stating that individuals who have maximum exposure to the radio are more likely to use condoms at last intercourse than individuals who have medium and/or low exposure to the radio is not supported. Overall, the model significantly predicted condom use at last intercourse χ^2 (16, N=343) 194.167, p <.001; 43 percent of the total variance is explained. Finally, this model correctly identifies who used a condom at last intercourse 83 percent of the time.

In regard to other predictors of the TPB model, attitudes, perceived behavioral control, and intention significantly predict condom use at last intercourse (please see Table 4-4). The odds of condom use who believe condom use is a sign of partner distrust were .426 times less than the odds of condom use among individuals who do not believe condom use is a sign of partner distrust (OR= .426, CI: (.216-.841)). Stated differently, individuals who do believe condom use is a sign of distrust are 57 percent less likely than individuals who do not believe condom use is a sign of partner distrust to use a condom at last intercourse.

Perceived behavioral control significantly predicted condom use at last intercourse (p<.001). The odds of condom use among somewhat confident individuals were .189 times less than the odds of condom use among very confident individuals (OR=.189, CI: (.074-.482)). Stated differently, individuals who are somewhat confident in their ability to influence condom use are 81 percent less likely than very confident individuals to use a condom at last intercourse. Individuals who are not at all confident in their ability to influence condom use are 87 percent less likely than very confident individuals to use condoms at last intercourse.

Used as a proxy for intention, condom use at first intercourse significantly predicts condom use at last intercourse ($p < .001$). The odds of using a condom among individuals who used a condom at first intercourse were 29.214 times more than the odds of using a condom among individuals who did not use a condom at first intercourse (OR=29.214, CI: (13.355-63.905)).

The only significant demographic predictor is middle school ($p < .034$). The odds of using a condom among individuals with middle education were 5.398 times more than the odds of using a condom among individuals with no education (OR=5.398, CI (1.136- 25.642)).

Table 4-4:

Odds Ratios Examining the Relationship Between Different Levels of Radio Exposure and Condom Use at Last Intercourse.

			95% C.I. OR	
Predictors	Sig.	OR	Lower	Upper
HIV knowledge	NS	1.027	.718	1.468
Gender (female is reference category)	NS	1.638	.832	3.226
Age (15-19 is reference category)	NS	2.688	.541	13.347
Residence (Rural is reference category)	NS	.976	.468	2.036
Education	NS			
Primary school	NS	3.639	.747	17.723
Middle school	.034	5.398	1.136	25.642
Not at all confident in influencing condom use	NS	3.605	.590	22.022
Wealth	NS			
Middle class	NS	.724	.338	1.552
Rich class	NS	1.275	.465	3.492
Condom reduces sexual pleasure	NS	1.156	.593	2.255
Condom use is a sign of distrust	.014	.426	.216	.841
Somewhat confident in influencing condom use	.001	.189	.074	.482
Not at all confident in influencing condom use	.001	.131	.057	.302
Condom use at first intercourse	.001	29.214	13.355	63.905
Low radio exposure (Maximum radio exposure is reference category)	NS	1.021	.449	2.323
Medium radio exposure	NS	1.357	.643	2.862

Note : Weighted sample N= 343.

Aim 2: Frequency levels of television exposure

Similar to the radio frequencies, different levels of television exposure do not significantly predict condom use at last intercourse. Hypothesis 2B is not supported; no significant relationship was found between frequency levels of television exposure and condom use at last intercourse. Nonetheless, the model is significant χ^2 (17, N= 343) = 193.637, $p < .001$; total variance explained is 43 percent ($R^2 = .431$). The only significant TPB predictors of condom use at last intercourse is perceived behavioral control, intention, and partially, attitudes (please see Table 4-5).

The odds of condom use among somewhat confident individuals were .187 times less than the odds of using a condom among very confident individuals (OR= .187, CI: (.073-.479)). Stated differently, individuals who are somewhat confident in their ability to influence condom use are 81 percent less likely than very confident individuals to use a condom at last intercourse. The odds of condom use among individuals who are not at all confident in influencing condom use were .131 times less than the odds of condom use among very confident individuals (OR=.131, CI: (.057-.302)). In other words, individuals who are not at all confident in their ability to influence condom use at last intercourse are 87 percent less likely than very confident individuals to use a condom at last intercourse. Condom use at first intercourse, used as a proxy for intention, significantly predicts condom use at last intercourse ($p < .001$). The odds of condom use among individuals who reported using a condom at first intercourse were 28.936 times more than the odds of condom use among individuals who did not use a condom at first intercourse (OR= 28.936, CI: (13.262-63.135)).

Finally, attitudes partially predict condom use at last intercourse ($p < .019$). The odds of using a condom among individuals who believe condom use is a sign of partner distrust are .447 times less than the odds of using a condom among individuals who do not believe condom use is a sign of partner distrust (OR= .447, CI: (.228-.877)). Stated differently, individuals who believe condom use is a sign of distrust are 55 percent less likely than individuals who do not believe condom use is a sign of partner distrust to use a condom at last intercourse.

Table 4-5:

Odds Ratios Examining the Relationship Between Different Levels of Television Exposure and Condom Use at Last Intercourse.

			95% C.I.OR	
Predictors	Sig.	OR	Lower	Upper
HIV knowledge	NS	1.016	.710	1.456
Gender (Female is the reference category)	NS	1.641	.838	3.211
Age (15-19 is the reference category)	NS	2.629	.523	13.222
Residence (Rural is the reference category)	NS	.996	.478	2.074
Education (No education is the reference category)	NS			
Primary school	NS	3.749	.769	18.285
Middle school	.031	5.526	1.169	26.131
Secondary school	NS	3.579	.606	21.125
Wealth (Poorest used as the reference category)	NS			
Middle class	NS	.712	.326	1.556
Rich class	NS	1.210	.426	3.436
Condom use reduces sexual pleasure	NS	1.172	.596	2.305
Condom use is a sign of distrust	.019	.447	.228	.877
Somewhat confident in influencing condom use	.001	.187	.073	.479
Not at all confident in influencing condom use	.001	.131	.057	.302
Condom use during first intercourse	.001	28.936	13.262	63.135
Max television exposure (least television exposure is reference category)	NS	1.198	.493	2.909
Med television exposure	NS	1.053	.458	2.423
Not television exposure	NS	1.000	.356	2.815

Note: Weighted sample N= 343

Aim 2: Frequency levels for newspaper/magazine exposure

Finally, hypothesis 2C is partially supported. The odds of condom use among individuals who are moderately exposed to HIV/AIDS prevention messages through the newspaper/magazine were 3.840 times more than the odds of condom use among individuals are not exposed at all (OR= 3.840, CI: (1.242-11.873) (please see table 4-6)). This supports the dose-effect theory that suggests greater frequency of exposure to newspaper/magazine positively predicts condom use at last intercourse. While least newspaper/magazine exposure is non-significant, the odds ratio in relationship to moderate and no exposure to newspaper/magazines is in the expected direction. Overall, the model significantly predicts condom use at last intercourse χ^2 (15, N=310) = 181.504, p <.001; the model explains 44 percent of the total variance. Similar to the previous models, perceived behavioral control, intention, and attitudes significantly predict condom use at last intercourse. The model correctly predicted 82 percent of the cases whether the individual would or would not use a condom at last intercourse.

Perceived behavioral control significantly predicted condom use at last intercourse. The odds of condom use among somewhat confident individuals were .226 times less than the odds of condom use among very confident individuals (OR= .226, CI: (.086-.593)). Stated differently, individuals who are somewhat confident in their ability to influence condom use are 77 percent less likely than very confident individuals to use a condom at last intercourse. Individuals who are not at all confident are 87 percent less likely than very confident individuals to use a condom at last intercourse.

Similarly, the odds of condom use among individuals who did use a condom at first intercourse were 32.681 times more than the odds of condom use among individuals who did not use a condom at first intercourse (OR=32.681, CI: (14.272-74.834)). Finally, attitudes marginally

predict condom use at last intercourse ($p<.10$). The odds of condom use among individuals who believe condom use is a sign of distrust were .495 times less than the odds of condom use among individuals who did not believe condom use is a sign of distrust (OR=.495, CI: (.241-1.015)). Stated differently, individuals who believe using a condom at last intercourse is a sign of partner distrust are 51 percent less likely than individuals who do not believe condom use is a sign of partner distrust to use a condom at last intercourse. These results should be interpreted with caution given that 17.1 percent of the cases for the frequency categories of newspaper/magazine exposure are missing cases.

Table 4-6:

Odds Ratios Examining the Relationship Between Different Levels of Newspaper/Magazine Exposure and Condom Use at Last Intercourse.

Predictors	Sig.	OR	95% C.I. OR Lower	95% C.I. OR Upper
HIV Knowledge	NS	.953	.658	1.379
Gender (female is reference category)	NS	1.538	.759	3.116
Age (15-19 is reference category)	NS	2.668	.510	13.957
Residence (Rural is reference category)	NS	.939	.436	2.022
Education (No education is reference category)	NS			
Primary school	NS	1.253	.539	2.909
Middle school	NS	.505	.134	1.911
Secondary school	NS			
Wealth (Poorest is reference category)	NS	.701	.319	1.541
Middle class	NS	1.004	.350	2.881
Rich class	NS	1.224	.604	2.484
Condom use is a sign of distrust	.055	.495	.241	1.015
Somewhat confident in influencing condom use	.003	.226	.086	.593
Not at all confident in influencing condom use	.001	.130	.054	.312
Condom use during first intercourse	.001	32.681	14.272	74.834
Moderate newspaper/magazine exposure	.019	3.840	1.242	11.873
Least newspaper/magazine exposure	NS	1.892	.844	4.239

Note: Weighted sampled N=310

Chapter 5

DISCUSSION & LIMITATIONS

Discussion

Results from this study provide support for the predictive power of the TPB model on actual condom use. Specifically, adding the determinants of the TPB increases the model explained variance from 8.8 to 45 percent. In regard to the TPB determinants, perceived behavioral control and intention consistently predicted condom use at last intercourse regardless of whether the levels of media exposure or type of media modality varied. Similarly, attitudes as measured by condom use as a sign of partner distrust consistently predicted condom use at last intercourse. Subjective norm significantly predicted condom use when measured by exposure to television, radio, and newspapers/magazine. Currently, support for the significance of all the TPB determinants in predicting intention and actual behavior varies across studies depending on the behavior and population being examined (Fishbein, 2002).

Findings from this study are consistent with prior studies that find mixed to positive support for the relationship between media exposure and actual condom use (Benefo, 2004; Bertrand et al., 2006; Bertrand & Anhang, 2006; Bessinger, Katende, & Gupta, 2004; Meekers, 2000; Peltzer & Seoka, 2004). Supporting prior studies, the current study finds exposure to HIV/AIDS messages in the television and newspapers/magazines significantly predicts condom use at last intercourse (Waithaka & Bessinger, 2001; Benefo, 2004; Benefo & Takyi, 2002; Katz, 2006). Segregating by urban and rural, Katz (2006) finds exposure to television to significantly predict condom use at last intercourse among individuals living in urban areas only. Contrary to

previous studies, this research finds television and newspaper exposure significantly predict condom use in the expected direction while radio exposure significantly predicted condom use in the opposite direction (Tambashe, et al., 2003; Peltzer & Seoka, 2004). A possible explanation is the lack of availability and affordability of condoms in rural areas. If condoms are inaccessible to individuals, the exposure to HIV/AIDS messages in the radio will have no effect on condom use at last intercourse among individuals who are exposed to the radio versus not exposed. Additionally, this study's finding of the dose-response effect of increased television exposure on condom use at last intercourse supports a prior study where exposure to three or more television spots containing HIV/STI prevention messages significantly predicted having used a condom at last intercourse (Underwood, Hachonda, Serlemitsos, & Bharath-Kumar, 2006). Finally, results from this study provide greater support for the effect of media exposure on condom use when compared to prior studies that only marginally support the effect of media exposure on increased condom use (Van Rossem & Meekers, 1999; Van Rossem & Meekers, 2000).

Overall, the nonsignificant findings for the relationship for the dose response theory between media exposure and condom use at last intercourse may suggest increased channeling of funds toward HIV/AIDS media prevention campaigns may be ineffective. It is possible individuals who are exposed to HIV/AIDS prevention messages through the media reach a threshold regarding the effectiveness of the messages in generating behavior change. Similarly, the results of the present analyses suggest that HIV/AIDS media prevention campaigns might want to focus on aspects related to an individual's perceived behavioral control as well as on beliefs that condom use is a sign of partner distrust. Using effective HIV/AIDS prevention media campaigns to target the significant TPB predictors could potentially positively affect condom use at last intercourse among Ghanaian adolescents from age 12-19.

Limitations

This study has several limitations. First, for the present study is the percentage of missing cases in regard to the number of individuals who did not report the frequency in which he/she read the newspaper or magazine. This item states: *Do you read the newspaper or magazine almost every day, at least once a week, less than once a week or not at all?* Using weights, 10 percent (n=37) of my total sample is reported as missing. The following steps were undertaken to examine whether these cases were missing at random. First, the categorical variable frequency of media exposure (MQ138) was recoded into a binary variable named frequency news no miss (1 = no missing, 0 otherwise). Cross tabs were conducted separately using the variable frequency news no miss by gender (1= male, 0= female), current area of residence (1 = urban, 0= rural), regions, wealth categories (0 = poorest, 1= middle, and 2= rich), age (1= 12-14, 0= 15-19), ever attended school, and highest level of educational attainment (0= no education, 1= primary, 2= middle school, 3= secondary). Based on results from the cross tabulations and χ^2 statistics, systematic missing data was detected for individuals who did not answer the item regarding the frequency in which he/she read the newspaper or magazine. χ^2 statistics were significant for wealth categories χ^2 (2, N= 362) = 29.049, $p < 0.001$; current area of residence χ^2 (3, N= 368) = 6.648, p = .010; highest level of educational attainment χ^2 (3, N= 369) 358.016, $p < .001$; and ever attended school χ^2= (1, N=369) = 357.949, $p < .001$. The chi square statistic for the highest level of educational attainment should be interpreted with caution since 25 percent of the cells had counts less than 5. Nonetheless, the φ and Cramer's V statistic for the cross tabulation between frequency news no miss and highest level of educational attainment is .985, $p < .001$, indicating a high correlation between variables and reinforcing the direction for the

results of the χ^2 test. Similarly, 25 percent of the cells (1 cell) for the cross tabulation between frequency news no miss and ever attended school has a count less than 5. Suggesting a correlation between the two variables, the coefficients for φ and Cramer's V statistic is .985, $p < .001$.

Findings from the cross tabulations and chi-square tests suggest individuals who did not respond to item MC 138 regarding the frequency in which he/she read the newspaper and/or magazine tend to have never attended school, be from the poorest wealth category, and to live in rural areas. Given the characteristics of the individuals who did not respond to the question, a possible explanation for the systematic missing data within the variable may be the complete lack of access to newspapers and/or magazines this population has. It is possible these individuals live in remote rural areas in Ghana were newspapers and/or magazines are inaccessible. A second possible explanation may be the lack of reading skills associated with never attending school. The significant chi square statistic for the relationship between frequency news no miss and ever attended school further supports the idea of the inability to read as a likely explanation for the missing cases. If one were to impute the missing cases for the frequency of which he/she reads the newspaper and/or magazine with "no news exposure", the possible explanations derived from the systematic missing data due to the relationship between frequency news no miss and other demographic variables would be forgone.

A second limitation is the low KMO statistic for the 1 factor PCA (0.408; $p < .001$). According to Leech, Barrett, and Morgan (2008), the KMO statistic is deemed inadequate if below .50. Nonetheless, the determinant is 0.018, indicating an analytic solution in the PCA can be determined. Similarly, the Bartlett test is significant at the $p < .001$ indicating enough correlation to provide a basis for principal component factor analysis. The one factor PCA

accounted for 20 percent of the total variance; in previous studies, the explained variance from a one factor PCA ranged from 12 to 27 percent (Vyas & Kumaranayake, 2006). A third limitation is the lack of measure for TPB's determinant of intention. The Ghanaian NSA (2004) does not have a question measuring respondents' intentions of using a condom in their next sexual. Given the data limitation, condom use at first intercourse was used as a proxy for intention in the TPB model. Fourth, it is possible respondents are hesitant to accurately respond to questions regarding their sexual experiences and encounters, therefore potentially biasing the results.

Lastly, the lack of ideal measurements for measuring the different TPB predictors can potentially bias the results. First, all measurements are subject to recall bias. Secondly, asking whether individuals have or have not heard or seen HIV/AIDS messages in the radio, television, or newspaper does not discriminate between individuals who already use a condom and therefore pay more attention to HIV/AIDS prevention messages on the media.

Conclusion

Current research predicts intent to use condoms, consistent condom use, and condom use at last intercourse using broad measures of media exposure. Studies have also focused on examining behavioral outcomes given one country specific HIV prevention campaign. However, limited information exists regarding the cost-effectiveness of mass media campaigns in increasing condom use and potentially averting the incidence of HIV infections among targeted populations. The current study informs mass media HIV prevention campaigns on the importance of targeting beliefs associated with the individual's ability to influence condom use as well as to address social perception of condom use as a sign of distrust among young adolescent couples. Additionally, this study shows that greater exposure to HIV prevention messages through the television positively predicts condom use at last intercourse. As has been done in campaigns such as *Stop AIDS Love Life* in Ghana, it is possible to increase the reach of HIV prevention messages broadcasted through the television by have audio/visual vans that allow hard to reach populations to also be exposed to the campaign.

Similarly, limited information exists on the message content used in studies measuring broad media exposure; message content is sometimes available among studies examining specific HIV campaigns. Furthermore, studies should examine whether certain message contents are more effective in motivating behavior change and increasing condom use. Overall, this study suggests that Ghanaian adolescents from age 12-19 who are exposed to HIV prevention messages through television and newspaper are significantly more likely to use condoms at last intercourse when compared to non-exposed individuals. Moreover, this study finds that

increased frequency of exposure to television is positively related to condom use at last intercourse. The need for effective HIV prevention mass media campaigns is greater as Ghanaian society hinders adolescents' access to HIV prevention information, making mass media exposure the only source of information for some adolescents.

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Appendix

Appendix:

Correlations for Items in Wealth Index

Items	Electricity	Radio	Television	Telephone	Refrigerator	Car or Truck	Motorcycle	Bicycle	Rooms in dwelling	Main cooking fuel	Pipe water in residence	Pipe into public tap	Inside well drinking water	Surface water for drinking
Electricity	1													
Radio	.116*	1												
TV	.559**	.207**	1											
Telephone	.224**	.121*	.357**	1										
Refrigerator	.441**	.159**	.669**	.401**	1									
Car/Truck	.273**	.033	.343**	.253**	.419**	1								
Motorcycle/Scooter	.085	-.064	.189**	-.044	.251**	.240**	1							
Bicycle	-.010	.128*	.021	-.011	.166**	.104	.030	1						
Rooms in dwelling	-.029	-.083	-.147**	-.046	-.232**	-.233**	-.258**	-.318**	1					
Main cooking fuel	.233**	.134*	.318**	.646**	.416**	.331**	-.040	-.067	-.066	1				
Pipe water in residence	-.325**	-.102	-.450**	-.377**	-.457**	-.101	-.046	-.011	.124*	-.405**	1			
Pipe into public tap	-.193**	.117*	-.089	.080	-.003	-.107*	-.027	.185**	-.139**	.008	-.198**	1		
Inside well drinking water	.025	-.091	.009	.001	.006	-.042	.049	.026	.022	-.058	-.103	-.168**	1	
Surface water for drinking	.181**	-.013	.256**	.070	.224**	.099	.037	.001	-.061	.115*	-.165**	-.269**	-.140**	1

Note: ** p < 0.001; * p<.05. N = 354. [a] Continuous variable. Multicollinearity is highlighted.

Appendix (continued):

Correlations for Items in Wealth Index

Items	Electricity	Radio	Television	Telephone	Refrigerator	Car or Truck	Motorcycle	Bicycle	Rooms in dwelling	Main cooking fuel	Pipe water in residence	Pipe into public tap	Inside well drinking water	Surface water for drinking
Public well	.230**	.004	.158**	.143**	.152**	.105*	-.022	-.134*	.017	.171**	-.245**	-.398**	-.208**	-.332**
Other source for drinking water	-.005	.041	.010	-.053	-.074	.006	.039	-.088	.135*	.058	-.084	-.136*	-.071	-.113*
Traditional pit	.171**	-.097	.049	.091	.064	.074	-.019	.144**	-.025	.169**	-.112*	-.058	.051	.165**
Ventilated improved pit	-.280**	-.012	-.078	.058	.005	-.024	.014	.032	-.067	.026	.010	.235**	-.035	-.188**
No toilet facility available	.249**	.167**	.239**	.115*	.195**	.082	-.023	-.205**	.072	.133*	-.165**	-.167**	-.038	.088
Other type of latrine	-.039	.023	-.007	.025	.049	.026	.016	.066	.046	.023	-.034	.020	-.028	-.046
Own flush toilet	-.249**	-.094	-.355**	-.481**	-.455**	-.224**	.038	-.023	.053	-.532**	.553**	-.103	-.020	-.110*
Cement flooring	.032	.094	.074	.166**	.097	.077	-.087	.055	.031	.204**	-.149**	.096	-.002	-.069
Carpet flooring	-.166**	-.139**	-.226**	-.419**	-.249**	-.135*	-.002	-.031	.017	-.446**	.244**	-.003	-.085	-.047
Earth/dung flooring	-.257**	-.073	-.349**	-.461**	-.460**	-.245**	.046	-.020	.022	-.585**	.476**	-.008	.030	-.134*
Wood, plank flooring	.171**	-.097	.049	.091	.064	.074	-.019	.144**	-.025	.169**	-.112*	-.058	.051	.165**
Palm, bamboo flooring	-.280**	-.012	-.078	.058	.005	-.024	.014	.032	-.067	.026	.010	.235**	-.035	-.188**
Parquet flooring	.249**	.167**	.239**	.115*	.195**	.082	-.023	-.205**	.072	.133*	-.165**	-.167**	-.038	.088
Other flooring	-.055	-.028	-.079	-.193**	-.101	-.193**	.008	.035	.070	-.211**	.147**	-.029	-.015	-.024
Any members own land	.084	.045	-.041	-.003	-.069	-.006	-.066	-.094	.093	.009	.092	.058	-.101	-.073

Note: ** p < 0.001; * p<.05. N = 354. [a] Continuous variable. Multicollinearity is highlighted.

Appendix (continued):

Correlations for Items in Wealth Index

Items	Public well	Other source for drinking water	Traditional pit	Ventilated improved pit	No toilet facility available	Other type of latrine	Own flush toilet	Cement flooring	Carpet flooring	Earth/ dung flooring	Wood plank flooring	Palm, bamboo flooring	Parquet flooring	Other flooring	Any members own land
Public well	1														
Other source for drinking water	-.168**	1													
Traditional pit	-.081	.089	1												
Ventilated improved pit	-.070	.051	-.504**	1											
No toilet facility available	.265**	-.110*	-.497**	-.302**	1										
Other type of latrine	.069	-.023	-.087	-.053	-.052	1									
Own flush toilet	-.144**	-.055	-.211**	-.128*	-.126*	-.022	1								
Cement flooring	.045	.048	.120*	-.114*	.048	.067	-.171**	1							
Carpet flooring	-.038	-.069	-.123*	.001	-.099	-.028	.414**	-.412**	1						
Earth/dung flooring	-.183**	-.068	-.257**	-.156**	-.154**	-.027	.819**	-.145**	.401**	1					
Wood, plank flooring	-.081	.089	1.000**	-.504**	-.497**	-.087	-.211**	.120*	-.123*	-.257**	1				
Palm, bamboo flooring	-.070	.051	-.504**	1.000**	-.302**	-.053	-.128*	-.114*	.001	-.156**	-.504**	1			
Parquet flooring	.265**	-.110*	-.497**	-.302**	1.000**	-.052	-.126*	.048	-.099	-.154**	-.497**	-.302**	1		
Other flooring	-.036	-.012	-.047	-.028	-.028	-.005	.222**	-.073	-.015	.181**	-.047	-.028	-.028	1	
Any members own land	-.019	.049	.023	-.073	.012	-.053	.108*	.025	.122*	.074	.023	-.073	.012	-.063	1

Note: ** p < 0.001; * p<.05. N = 354. [a] Continuous variable. Multicollinearity is highlighted.