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Determinants of condom use among heterosexual young men and women in southeastern Ghana: a mediation analysis

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ABSTRACT

Sexual risk behaviour among young people raises public health concerns in Ghana. This study aimed to determine the predictors of condom use among heterosexual young people in the eastern region of Ghana, using a health behaviour theory – the theory of planned behaviour (TPB). Participants completed a questionnaire battery assessing attitudes, subjective norms, perceived behavioural control, intentions and condom use behaviour. Structural equation modelling procedures were used to analyse the data. Attitudes towards condom use and perceived behavioural control over condom use were significantly positively associated with the intention to use condoms. Intention to use condoms predicted condom use behaviour. Moreover, intention to use condoms mediated the attitude–behaviour relationship, and the perceived control–behaviour relationship. These results highlight the importance of using behavioural beliefs, perceived control beliefs and behavioural intention as key variables in condom promotion programmes among in-school heterosexual youth in the eastern region of Ghana.

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Adolescent sexual health; sexual risk behaviour; condoms; structural equation model; mediation analysis

Introduction

Sexual risk behaviour among young people has major public health implications worldwide. These health implications include the risk of sexually transmitted infections (STIs), HIV and unintended pregnancy (Harrison, Weinstangel, Dalziel, & Moreau, 2014; Reed & Huppert, 2011; Zou et al., 2014). In sub-Saharan Africa young people’s sexual behaviour is generally associated with risks and health problems (Doyle, Mavedzenge, Plummer, & Ross, 2012; Gevers, Mathews, Cupp, Russell, & Jewkes, 2013; Salih, Metaferia, Reda, & Biadgilign, 2014). For example, there is research demonstrating that sexual risk behaviour among young sub-Saharan Africans renders them vulnerable to adverse sexual health outcomes (Eaton, Flisher, & Aarø, 2003; Pettifor et al., 2011; Potterat, Brewer, Gisselquist, & Brody, 2012).

In Ghana, many young people become sexually experienced before they are 18 years of age (Doku, 2012; Morhe, Tagbor, Ankobea, & Danso, 2012; Owusu-Addo, Owusu-Addo, & Morhe, 2016). In three administrative regions of Ghana (i.e. Northern, Brong Ahafo and Greater Accra) among 2990 high school adolescents, Awusabo-Asare et al. (2017) found that 43% of adolescent women and 27% of adolescent men reported having had sexual intercourse. Of those who reported having had sexual intercourse, 12% of adolescent women and 9% of adolescent men reported initiating sexual intercourse before the age of 15. Other work among sexually experienced Ghanaians aged 12–24 years indicated that, 4 in 10 young women, and 6 in 10 young men reported having engaged in multiple...
sexual partnerships (Guttmacher Institute, 2004). As a consequence, many young Ghanaians face sexual health threats due to early sexual debut, often without protection against diseases and pregnancy (Aziato et al., 2016; Bingenheimer & Stoebenau, 2016; Ghana Statistical Service/Ghana Health Service, 2015; Krugu, Mevissen, Münkel, & Ruiter, 2017).

The eastern region is one of the 10 administrative regions of Ghana. It is one of the regions reported to be most affected by HIV/AIDS (Ghana AIDS Commission, 2014). For example, in 2014, as with previous years, the highest HIV prevalence rate of 3.7% was recorded in the eastern region. Given this, young people residing in this region may experience individual-and community-level risks of HIV and other STIs. Of the total human population in the eastern region, young people aged 5–24 years accounted for 43.78% and about 60% of young people aged 15 years and older in this region are currently in school (Ghana Statistical Service [Census 2010], 2012, 2013).

Previous data on sexual debut among young people in Ghana indicated that 1 in 5 young women aged 15–24 years in the eastern region reported having an STI case. Further, the data suggested that 1 in 20 young people in the eastern region resides in a home where someone is either diagnosed with HIV, has died of AIDS or has undetected HIV (Ghana Statistical Service/Ghana Health Service, 2009). Viewed from this perspective, it would seem important to understand how young people in the eastern region perceive their risk of HIV infection and other STIs, what sexual risk reduction behaviours they engage in and whether social norms in this setting have any influence on young people’s sexual health practices. This information may help guide the design of behavioural interventions in response to these perceptions, beliefs and social norms.

**Young people’s sexual activity and condom use**

There is ample evidence that correct and consistent condom use reduces young people’s risk of HIV, STI and of unintended pregnancy (Cleland & Ali, 2006; Valadez et al., 2014; Weller & Davis-Beaty, 2002; Widman, Noar, Choukas-Bradley, & Francis, 2014). Yet, by all accounts, only a few young Ghanaians use condoms (Abdul-Rahman, Marrone, & Johansson, 2011; Adu-Mireku, 2003; Bingenheimer & Stoebenau, 2016; Karim, Magnani, Morgan, & Bond, 2003; Krugu et al., 2017; Sallar, 2009). In addition, recent research has shown that interventions to reduce young people’s risk for HIV and pregnancy in Ghana have had little impact on young people’s sexual behaviour. This is because, although these interventions served to increase HIV knowledge among young people, this knowledge rarely translated into attitudinal and behavioural change (Appiah-Agyekum & Suapim, 2013). For example, of a total of 971, 268 registered pregnancies in Ghana in 2013, young women aged 10–24 years accounted for 39% (Ghana Statistical Service/Ghana Health Service, 2015).

A possible explanation for the rise in sexual risk behaviour among young Ghanaians is that interventions aimed at reducing sexual risk have not been guided by sound theoretical models. Due to the limited explanatory value of these interventions, the psychosocial drivers for unprotected sexual behaviour and beliefs of school-going youth in the eastern region of Ghana remain poorly understood. A related problem is that HIV-risk preventive programmes in senior high schools in the eastern region of Ghana do not offer free condoms to students. Thus, sexually active students do not have access to free condoms in washrooms or at other vantage points on their school compound. It would, therefore, seem unlikely that senior high school students in the eastern region of Ghana could actually obtain condoms and use them if they needed them. This problem warrants investigation to address key questions. Why do some young people in the eastern region of Ghana use condoms but others do not? What attitudes towards condom use, normative beliefs about condom use and self-efficacy beliefs about condom use do young people in the eastern region of Ghana have? How does behavioural intention link attitudinal, normative and self-efficacy beliefs about condom use to the actual behaviour of young people in the eastern region? This study used the theory of planned behaviour (TPB) (Ajzen, 1991) to guide its investigation.
Theory of planned behaviour

The TPB (Ajzen, 1991) evolved from the theory of reasoned action (Fishbein & Ajzen, 2010). The TPB postulates that an individual’s intention to engage in a specified behaviour (e.g. condom use) is determined by his or her attitudes, his or her perceived control beliefs and by the prevailing social norms within his or her social context regarding that behaviour. The TPB also assumes that the most important determinant of a specified overt behaviour is an individual’s behavioural intention towards that specified behaviour. Several meta-analyses and systematic reviews have reported empirical support for the TPB’s predictive ability regarding young people’s sexual behaviour in general and condom use in particular (Albarracín, Johnson, Fishbein, & Muellerleile, 2001; Albarracín, Kumkale, & Johnson, 2004; Bennett & Bozionelos, 2000).

Although there is overwhelming empirical support for the applicability of the TPB in predicting heterosexual condom use intentions and behaviour in some countries in the West (e.g. see Carmack & Lewis-Moss, 2009; Montanaro & Bryan, 2014; Rich, Mullan, Sainsbury, & Kuczmierycz, 2014) and in some countries in Africa (e.g. see Bryan, Kagee, & Broaddus, 2006; Sacolo et al., 2013; Schaalme et al., 2009), the TPB model has not yet been applied to explicate young people’s sexual risk preventive intentions and behaviour in Ghana. Consistent with the TPB, we hypothesised that: (H(1)) attitudes towards condom use, subjective norms regarding condom use and perceived behavioural control over condom use would be significantly positively associated with intentions to use condoms; (H(2)) intentions to use condoms would be significantly positively associated with condom use behaviour and (H(3)) intentions to use condoms would mediate the attitude–behaviour relation, the subjective norm–behaviour relation and the perceived control–behaviour relation. This study had two goals. The first goal was to test the TPB’s ability to explain the intention to use condoms and condom use behaviour among heterosexual youths in eastern Ghana. The second goal was to identify the most salient components of the TPB that explain this sample’s intention to use condoms and condom use behaviour.

Method

Participants and setting

Participants (N = 684) aged 14–20 years (i.e. 9th–12th grade) from a municipal senior high school in the Lower Manya Krobo Municipality (LMKM), Ghana, provided baseline data for the present analysis. The baseline data were obtained in 2013. The LMKM is located in the eastern region of Ghana, and it is home to 89,246 inhabitants (Ghana Statistical Service [Census 2010], 2013). Of the 10 Municipalities and 16 Districts in the eastern region, the LMKM is the municipality reported to be disproportionately affected by HIV/AIDS (Ghana AIDS Commission, 2014). Consequently, senior high school students in this municipality do participate in HIV and STI prevention programmes while enrolled in school. Thus, the majority of students in the participating school have fairly homogeneous background information regarding HIV/AIDS and STI transmission routes and prevention methods. For example, in the participating school, HIV-risk prevention posters had been posted on classroom walls, and large billboards containing HIV-risk prevention information had been erected at vantage points on the school compound.

In addition, study participants could be described as having a homogeneous low-socioeconomic background, because they reside in low-socioeconomic status (SES) households in low-SES communities, according to 2010 census data in Ghana (Ghana Statistical Service, 2013). This study was approved by the Health Ethics Research Committee of Stellenbosch University, South Africa (HREC#: S12/06/179) and by the Institutional Review Board of the Noguchi Memorial Institute for Medical Research, University of Ghana (NMIMR-IRB#:034/12-13).

Data collection

All participants provided written consent and assent prior to participation in this study. The Parent–Teacher Association of the participating school, acting in loco parentis, waived parental consent for
interested students aged 14–17 years, who were not legally eligible to sign consent themselves, to participate in this study through the provision of written assent. Permission was obtained from the Ghana Education Service and from authorities in the participating school. A convenience sampling technique was used to recruit participants. Eligibility criteria included being 14 years of age or older and a willingness to participate. The confidentiality of participants’ responses and the anonymity of their participation were assured and ensured. Participants were made aware that their participation was voluntary and that they could withdraw from the surveys at any point in time during survey administration. Participants completed a paper-and-pencil survey based on the TPB’s constituent components of attitudes, subjective norms, perceived behavioural control, intentions and behaviour. The surveys were completed during school hours in the classrooms. They also completed assent and consent forms according to their self-declared ages. Teachers of the school were denied access to survey completion venues and to survey data provided by their students.

**Measures**

We selected all the items we used in this study from previously published research. To learn how potential participants would understand and respond to each of these items on the survey questionnaire, we conducted a pilot study. Pilot data were obtained from 20 potential participants. The pilot survey took an average of 25 min to complete and was administered twice to the same participants, with 2 weeks interval between the first and second administrations. We calculated test–retest reliability coefficients for the 2 weeks interval. The coefficients for the five scales ranged from $r = .68$ to $r = .81$ were considered acceptable.

**Demographic characteristics**

Participants’ gender, age and student status (Day student or Boarding student) were assessed. Sixteen items adapted from previous research were included in the questionnaire to elicit background information regarding respondents’ general protected sexual behaviour (sexual history), HIV knowledge as well as their personal beliefs. The responses were scaled as follows (1 = yes; 2 = no; 3 = don’t know). A third-person-report strategy was employed in the background variables to maximise information on youth sexual behaviour. Sample items include ‘Do you have friends your age who have had sex before?’, ‘Do your friends who have had sex use condoms?’, ‘Do you know of a friend your age who ever got pregnant?’ These sociodemographic data are presented in Table 2.

**Attitudes towards condom use**

Five items assessed participants’ attitudinal beliefs about condom use. These items had previously been used successfully by Basen-Engquist et al. (1999) and by Carmack and Lewis-Moss (2009). The response scale ranged from 1 (strongly disagree) to 7 (strongly agree). Sample items include ‘I believe condoms should always be used if a person my age has sex’. We scored scale responses such that higher scores indicated more favourable attitudinal beliefs about condom use. The composite mean score, standard deviation and coefficient alpha for attitudes towards condom use were as follows: $M = 5.64$, $SD = 0.06$, $\alpha = .72$; 95% CI [.65, .72].

**Subjective norms regarding condom use**

Five items assessed participants’ perception of descriptive normative influences on them regarding condom use. The items were obtained from previous research with adolescents (Anderson et al., 2006; Basen-Engquist et al., 1999; DeHart & Birkimer, 1997). The response scale ranged from 1 (strongly disagree) to 7 (strongly agree). Sample items include ‘Most of my friends believe condoms should always be used if a person my age has sex, even if the two people trust each other very well’. We scored scale responses such that higher scores indicated greater perceived normative influence and motivation to comply with peer norms regarding condom use. The composite mean
score, standard deviation and coefficient alpha for subjective norms regarding condom use were as follows: \( M = 5.55, SD = 0.04, \alpha = .71; 95\% \text{ CI } [.67, .74]. \)

**Perceived behavioural control over condom use**

Four items assessed participants’ perceived behavioural control over condom use. The items had been used in previous research with adolescents (Carmack & Lewis-Moss, 2009; Jemmott et al., 2007). The items assessed both perceived difficulty and perceived self-efficacy regarding condom use. The response scale ranged from 1 (strongly disagree) to 7 (strongly agree). Sample items include ‘I can use a condom correctly’. We scored scale responses such that higher scores reflected a greater perceived efficacy or controllability over condom use. The composite mean score, standard deviation and coefficient alpha for perceived behavioural control over condom use were as follows: \( M = 5.25, SD = 0.90, \alpha = .75; 95\% \text{ CI } [.71, .78]. \)

**Behavioural intentions towards future condom use**

Six items assessed participants’ intentions to use condoms in the future (i.e. over the coming three months). The items were obtained from previous research (DeHart & Birkimer, 1997). The response scale ranged from 1 (strongly disagree) to 7 (strongly agree). Sample items include ‘I intend to use condoms if I have sex in the next three months’. We scored scale responses such that higher scores indicated more favourable intentions towards condom use over the next three months. The composite mean score, standard deviation and coefficient alpha for intentions to use condoms were as follows: \( M = 5.59, SD = 0.19, \alpha = .84; 95\% \text{ CI } [.82, .86]. \)

**Condom use behaviour**

Seven items assessed participants’ self-reported condom use over the past three months, using items adapted from previous research (Holland & French, 2012; Walsh, Senn, Scott-Sheldon, Vanable, & Carey, 2011). Participants were required to report their condom-protected sexual behaviour patterns by indicating how often they engaged in heterosexual sexual intercourse and how often they or their sexual partner used condoms during those sexual acts. Following the pilot study, two items were slightly modified. The response scale for this construct ranged from 1 (never) to 7 (all the time). Sample items include ‘How often have you had sex with your regular boyfriend/girlfriend with a condom in the past three months?’; ‘How often have you had sex with someone who is not your regular boyfriend/girlfriend with a condom in the past three months?’ We scored scale responses such that higher scores indicated greater self-reported condom use behaviour over the past three months. The composite mean score, standard deviation and coefficient alpha for condom use behaviour were as follows: \( M = 2.91, SD = 0.14, \alpha = .89; 95\% \text{ CI } [.87, .90]. \)

**Statistical analyses**

We undertook all preliminary data analyses on the five TPB components of interest using IBM SPSS statistics package (v20; Arbuckle, 2011). West, Finch, and Curran’s (1995) cut-off criteria of items with distribution values of skewness (−2.00 and +2.00) and kurtosis (−7.00 and +7.00) were used to check the data for normality. All five constructs under consideration were normally distributed. Following this, we carried out exploratory factor analyses (EFA) and extracted factors with a maximum likelihood (ML) estimator. Using Kaiser’s criterion, we retained only factors with eigenvalues of 1.0 or more for further analysis. After identifying the number of factors, we used direct oblimin (oblique rotation) to determine factor solutions for each of the five constructs of the TPB. We used Field’s (2009) cut-off criteria (≥.40) to determine which items load on a factor. The establishment of construct dimensionality is a prerequisite for latent variable structural equation modelling (Kline, 2011). Each of the five constructs of interest demonstrated sufficient common variance. Next, we determined score reliability (Thompson & Vacha-Haase, 2000), also known as internal consistency reliability, for each multi-item construct for this sample.
Item-parcelling (Little, Cunningham, Shahar, & Widaman, 2002; Little, Rhemtulla, Gibson, & Schoemann, 2013) was used to reduce the number of scale items to three or four. Parcel-level indicators were created with unidimensional scale items, using the item-to-construct balancing approach (Alhija & Wisenbaker, 2006). That is, for each latent construct, items that load on it are arranged from highest to lowest. Then the first item with the highest loading is paired with the first item with the lowest loading, and a mean score is computed to create a parcel-level indicator. This pairing procedure is followed through till all items indicating a latent construct are exhausted. For example, in this study, ‘Attitudes towards condom use’ has five items. The item with the highest loading (item 1) is paired with the item with the lowest loading (item 5) and a mean score is computed to create the first parcel (indicator 1). Next, the item with the second high loading (item 2) is paired with the item with the next lowest loading (item 4) and a mean is computed to create the second parcel (indicator 2). Then the third item (item 3) remains an item-level indicator because there is none to pair up with. Attitudes towards condom use therefore had two parcel-level indicators and one item-level indicator. After the creation of parcels, we requested bivariate correlations to inspect the matrix. As can be seen in Table 1, each latent construct exhibited robust intra-construct correlations between its indicators.

**Structural equation modelling**

We used Anderson and Gerbing’s (1988) two-step approach to guide all the structural equation analyses in this study. We conducted the structural equation analyses in Mplus for Windows (v6.0; Muthén & Muthén, 1998–2010) with maximum likelihood robust (MLR) estimation. The following global fit indices were used to determine the goodness-of-fit of the models: chi-square test statistic ($\chi^2$) with degrees of freedom, chi-square/degrees of freedom ($\chi^2$/df) ratio <3.0, comparative fit index (CFI ≥ .95), root mean square error of approximation (RMSEA < .07) with confidence interval and the standardised root mean square residual (SRMR < .05). Throughout this modelling process, we did not carry out any suggested model modifications because the modification suggestions were theoretically implausible. The percentage of cases with some missing data points in this study was 0.15%. We handled missing data with the full information maximum likelihood estimation procedure inherent in Mplus.

**Results**

**Descriptive analysis**

Table 2 shows participants’ sociodemographic information, as well as their responses to various questions relating to their sexual behaviour, condom use beliefs and knowledge. As can be seen in Table 2, about 51.9% of female participants and 63% of male participants indicated that they had previously engaged in sexual intercourse. Furthermore, 49.3% of young men and young women reported that they had used condoms before. Whereas a sizeable proportion of young men and young women (37.1%) revealed that they were worried about contracting HIV, approximately 25.7% believed that they were too young to acquire HIV. As with most previous investigations of adolescent sexual behaviour, the majority of participants in this study (82.5%) believed that their friends were frequently engaging in sexual intercourse.

**Confirmatory factor analysis**

Confirmatory factor analysis (CFA) was performed to test the goodness-of-fit of the measurement model, employing MLR estimation. This CFA produced good model-data fit, $\chi^2$ (109, $N = 684$) = 191.21, $p < .001$, $\chi^2$/df = 1.75, CFI = .973, RMSEA = .033; 90% CI [.03, .04], SRMR = .036, suggesting measurement adequacy for the five TPB constructs under consideration. Factor loadings for items on the five constructs were significant ($p < .001$).
Table 1. Bivariate correlations among latent variable indicators.

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<td></td>
</tr>
</tbody>
</table>

A_{1-3} = indicators for the latent variable ‘attitudes towards condom use’; SN_{1-3} = indicators for the latent variable ‘subjective norm regarding condom use’; PBC_{1-4} = indicators for the latent variable ‘perceived behavioural control over condom use’; I_{1-3} = indicators for the latent variable ‘intention towards future condom use’; and B_{1-4} = indicators for the latent variable ‘condom use behaviour’. Highlighted portions indicate intra-construct correlations.

*p < .05. **p < .01. ***p < .001.
To examine the direct relationships between the five constructs of the TPB, we tested a structural model. This structural model showed good model fit, $\chi^2(112, N = 684) = 241.12$, $p < .001$, $\chi^2$/df = 2.15, CFI = .967, RMSEA = .041; 90% CI [.034, .048], SRMR = .041. As can be seen in Figure 1, attitudes towards condom use ($b = .38; 95\% \text{ CI} [.14, .62], p < .01$) and perceived control over condom use ($b = .47; 95\% \text{ CI} [.31, .63], p < .001$) were both significantly positively associated with the intention to use condoms. Intentions to use condoms were, in turn, significantly positively associated with condom use behaviour ($b = .41; 95\% \text{ CI} [.28, .55], p < .001$). Subjective norms regarding condom use were, however, not statistically significantly associated with the intention to use condoms ($b = .06; 95\% \text{ CI} [−.14, .26], p = .593$). The correlation coefficients between the predictor variables were as follows: attitude with subjective norms, $r = .40$; attitude with perceived control, $r = .61$; and subjective norms with perceived control, $r = .55$. Correlations were significant at $p < .001$.

### Table 2. Demographic and background characteristics of the sample. (n = 684)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14–15</td>
<td>80</td>
<td>11.7</td>
</tr>
<tr>
<td>16–17</td>
<td>370</td>
<td>54.1</td>
</tr>
<tr>
<td>18–20</td>
<td>234</td>
<td>34.2</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>335</td>
<td>49.0</td>
</tr>
<tr>
<td>Female</td>
<td>349</td>
<td>51.0</td>
</tr>
<tr>
<td>Student status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day</td>
<td>266</td>
<td>38.9</td>
</tr>
<tr>
<td>Boarding</td>
<td>418</td>
<td>61.1</td>
</tr>
<tr>
<td>As a boy, have you ever had sex with a girl?</td>
<td>Yes</td>
<td>63</td>
</tr>
<tr>
<td>As a girl, have you ever had sex with a boy?</td>
<td>Yes</td>
<td>51.9</td>
</tr>
<tr>
<td>Have you ever used a condom?</td>
<td>Yes</td>
<td>49.3</td>
</tr>
<tr>
<td>Have you ever given or received money for having sex with someone?</td>
<td>Yes</td>
<td>20.6</td>
</tr>
<tr>
<td>Have you been personally diagnosed of STDs like syphilis or gonorrhoea before?</td>
<td>Yes</td>
<td>9.2</td>
</tr>
<tr>
<td>Are you currently using any birth control method?</td>
<td>Yes</td>
<td>13.5</td>
</tr>
<tr>
<td>Do you worry that you might get an HIV infection?</td>
<td>Yes</td>
<td>37.1</td>
</tr>
<tr>
<td>Will you be happy to take an HIV test to know your status?</td>
<td>Yes</td>
<td>87.6</td>
</tr>
<tr>
<td>Do you know someone who is diagnosed of HIV or AIDS?</td>
<td>Yes</td>
<td>21.2</td>
</tr>
<tr>
<td>Do you know someone who died of HIV/AIDS?</td>
<td>Yes</td>
<td>31.4</td>
</tr>
<tr>
<td>Can a pregnant woman give HIV to her baby?</td>
<td>Yes</td>
<td>78.5</td>
</tr>
<tr>
<td>Can a person have HIV and not show signs of any disease?</td>
<td>Yes</td>
<td>49.3</td>
</tr>
<tr>
<td>Do you have friends your age who have had sex before?</td>
<td>Yes</td>
<td>82.5</td>
</tr>
<tr>
<td>Do your friends who have sex use condoms?</td>
<td>Yes</td>
<td>34.5</td>
</tr>
<tr>
<td>Do you know of a friend your age who ever got pregnant?</td>
<td>Yes</td>
<td>80.7</td>
</tr>
<tr>
<td>Are people your age too young to get an HIV infection?</td>
<td>Yes</td>
<td>25.7</td>
</tr>
</tbody>
</table>

aData are presented for male and female participants separately.

bData are presented for male and female participants combined.

### Structural analysis

To examine the direct relationships between the five constructs of the TPB, we tested a structural model. This structural model showed good model fit, $\chi^2(112, N = 684) = 241.12$, $p < .001$, $\chi^2$/df = 2.15, CFI = .967, RMSEA = .041; 90% CI [.034, .048], SRMR = .041. As can be seen in Figure 1, attitudes towards condom use ($b = .38; 95\% \text{ CI} [.14, .62], p < .01$) and perceived control over condom use ($b = .47; 95\% \text{ CI} [.31, .63], p < .001$) were both significantly positively associated with the intention to use condoms. Intentions to use condoms were, in turn, significantly positively associated with condom use behaviour ($b = .41; 95\% \text{ CI} [.28, .55], p < .001$). Subjective norms regarding condom use were, however, not statistically significantly associated with the intention to use condoms ($b = .06; 95\% \text{ CI} [−.14, .26], p = .593$). The correlation coefficients between the predictor variables were as follows: attitude with subjective norms, $r = .40$; attitude with perceived control, $r = .61$; and subjective norms with perceived control, $r = .55$. Correlations were significant at $p < .001$.

### Mediation analysis

The cross-sectional mediation processes described by the TPB were examined. Preacher and Hayes (2004, 2008) recommended the use of bootstrapping to estimate indirect effects in simple mediation designs such as the mediation processes postulated by the TPB. Bootstrapping with 1000 resamples with replacement was used in this study with ML estimation. Intention to use condoms mediated ($b = .16; 95\% \text{ CI} [.04, .27], p < .01$) the attitude–behaviour relationship. In addition, the intention to use condoms mediated ($b = .20; 95\% \text{ CI} [.11, .28], p < .001$) the perceived control–behaviour relationship. The direct effect between subjective norm and intention was not significant; thus, we did not calculate mediation for the subjective norm–behaviour relationship. This
cross-sectional structural model explained 61% of the variance in the intention to use condoms and 8% of the variance in condom use behaviour.

Summary of findings

Consistent with the TPB, in this study attitudes towards condom use were positively associated with the intention to use condoms. In addition, perceived behavioural control over condom use was positively associated with the intention to use condoms. Moreover, intentions to use condoms predicted condom use behaviour. Further, intentions to use condoms mediated the attitude–behaviour relationship, and the perceived control–behaviour relationship. However, subjective norms regarding condom use were not associated with the intention to use condoms, contrary to the postulate of the TPB.

Discussion

The primary aim of this study was to test the TPB’s ability to explain the intention to use condoms and condom use behaviour among heterosexual adolescents in the eastern region of Ghana. The secondary aim was to identify the most salient components of the TPB that explain the intention to use condoms and condom use behaviour of this sample. To achieve these aims, we obtained cross-sectional data on attitudes towards condom use, subjective norms regarding condom use, perceived behavioural control over condom use, intentions to use condoms and condom use behaviour from 684 in-school heterosexual adolescents. We used latent variable structural equation modelling procedures to analyse the data set. In this study, there was a statistically significant association between attitudes towards condom use and intentions to use condoms in the future. Perceived behavioural control over condom use was statistically significantly related to intentions to use condoms in the future. However, no support was found for the relationship between

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**Figure 1.** Cross-sectional structural equation model of the effects of attitude towards condom use and perceived behavioural control over condom use on self-reported condom use, depicting mediation via intention to use condoms among Ghanaian senior high school students. Subjective norms regarding condom use was nonsignificant. Unstandardised coefficients are reported for significant paths.

Model fit: $\chi^2(112, N = 684) = 241.12, p < .001, \chi^2/df = 2.15$, comparative fit index = .967, root mean square error of approximation = .041, 90% CI [.034, .048], SRMR = .041. The correlations between the predictor variables were as follows: Attitude with subjective norms, $r = .40^{***}$; attitude with perceived behavioural control, $r = .61^{***}$; and subjective norms with perceived behavioural control, $r = .55^{***}$.

** $p < .01$. *** $p < .001$. 

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cross-sectional structural model explained 61% of the variance in the intention to use condoms and 8% of the variance in condom use behaviour.
subjective norms regarding condom use and intentions to use condoms. Consistent with the TPB’s postulate, intentions to use condoms mediated the attitude–condom use behaviour relationship and the perceived control–condom use behaviour relationship.

These results are consistent with findings from other previous studies with high school adolescents in some African countries. For example, Bryan et al. (2006) tested a TPB model to predict intentions to use condoms and condom use behaviour of 261 South African adolescents. They found that intentions to use condoms explained 14% of the variance in condom use behaviour. Similarly, Jemmott et al. (2007) tested the TPB’s predictive validity among 390 Xhosa-speaking South African adolescents recruited from public high schools. They examined students’ intentions to use condoms in order to prevent sexually transmitted HIV. They found that attitudes towards condom use and perceived behavioural control over condom use were strong predictors of students’ intentions to use condoms. In Ethiopia, Molla, Åstrøm and Brehane (2007) examined the applicability of the TPB in predicting condom use intentions and behaviour of 802 young adult women. They reported that the TPB model explained 36% and 5.3% of the variance in participants’ condom use intentions and behaviour, respectively. Sacolo et al. (2013) used the TPB’s framework to understand psychosocial factors associated with young people’s intentions to adopt protective sexual behaviours among 369 students aged 15–19 years recruited from high schools in Swaziland. They reported that of the five TPB components, perceived behavioural control was the most salient predictor of condom use intentions among this sample. Further, a TPB-based condom use investigation among a large sample of 15,782 high school youths drawn from Cape Town, South Africa, and from Dar es Salaam, Tanzania, was undertaken by Schaalma et al. (2009). These investigators used the TPB’s framework to guide their investigation. They reported that 77% of the variance in high school adolescents’ intentions to use condoms was explained by the linear combination of attitudes, subjective norms and perceived behavioural control.

Contrary to the TPB’s prediction, this study did not confirm the association between subjective norms and intentions. This finding is comparable to that of research conducted in South Africa (Jemmott et al., 2007). In this study, items measuring the subjective norm construct focused on descriptive norms, specifically peer norms (what friends say and do, that is, whether their friends use condoms and what their friends say about condom use) and not on injunctive norms (what significant others expect the adolescent to do, the infractions of which attract punishment). Our goal was to assess whether these perceptions (if any) would, in turn, influence them to use condoms. It is possible that descriptive peer norms are not considered salient for condom use intentions and behaviour by the current sample (i.e. high school youth in the eastern region of Ghana). In part, this may be because many Ghanaian youths do not perceive of their friends as using condoms during sexual encounters. In other words, they seem to think that their friends do not use condoms and will therefore not expect them to use condoms as well. This reason seems to find support in the sexual behaviour literature in Ghana which suggests that only a few young people in Ghana use condoms.

Another possible explanation for the non-salience of normative influence on condom use intentions and behaviour in this novel socio-cultural context (Ghana) is that youth sexual behaviour, in many parts of Ghana, is associated with social stigma and sexual stereotype (Riley & Baah-Odoom, 2010). That is, parents, teachers, religious leaders and significant others actively discourage young people from engaging in premarital sexual intercourse (Manu, Mba, Asare, Odoi-Agyarko, & Asante, 2015), in line with prevailing socio-cultural norms and religious teachings.

Correspondingly, young people in Ghana rarely discuss their sexual activities with their friends for fear that this information might be divulged to their parents, teachers and significant others (Darteh, Doku, & Esia-Donkoh, 2014; Darteh & Nnorom, 2012; see also Biddlecom, Munthali, Singh, & Woog, 2007). We believe that these reasons serve to explain why descriptive norms as one of the sources of social influence on youth sexual behaviour do not seem to be considered by Ghanaian adolescents as salient for condom use.
From this literature, it seems clear that the prevailing cultural and societal restrictions on youth sexual behaviour in Ghana have provided a context for young people to consider their sexual relationships as strictly private and confidential affairs. Tamale (2011) demonstrated that the secrecy and social stigma surrounding African sexualities have hampered attempts to provide comprehensive sexual health education and health literacy in African communities. However, it is worth noting that the conflicting results we found in this study regarding subjective norms are not unexpected because findings from prior research on the subjective norm–intention relationship are mixed. For example, whereas Giles, Liddell, and Bydawell (2005) found subjective norms to be the most important predictor of condom use intentions among Zulu youths in South Africa, Jemmott et al. (2007) noted that subjective norms were not a significant predictor of South African Xhosa-speaking high school youths’ intentions to use condoms. Rather and consistent with the current study, Jemmott et al. (2007) found attitudes and perceived behavioural control to be the most influential determinants of condom use intentions among Xhosa-speaking youths.

**Implication of results**

The findings of this study highlight opportunities for sexual risk reduction (i.e. STIs, HIV and unintended pregnancy) interventions for high school youths in eastern Ghana. The majority of respondents in this study were early adolescents between the age of 16 and 17 years. This is the age at which the majority of young people in Ghana initiate sexual behaviour (Adu-Mireku, 2003; Morhe et al., 2012; Odonkor, Nonvignon, Adu, Okyere, & Mahami, 2012). The components of the TPB that are considered salient for condom use among this sample are attitudes, perceived behavioural control and intentions. Since attitudes towards condom use were associated with intentions to use condoms and condom use behaviour, attitudes should be considered as key variables and be included in safe sex interventions among young people in eastern Ghana.

For example, an important intervention approach to bring about attitude modification regarding safe sex behaviours would be to design attitude-based informational programmes, using persuasive messages via traditional media, social media, cell phones and via direct small-group interactions. Such attitude-based informational interventions might be in the form of posters, leaflets, flyers, text messages, booklets and social media posts. These attitude-based interventions, where necessary, could include films, drama, novels and poetry recitals.

Throughout these activities, efforts should be made for adolescents to have direct contact with condoms. These experiential sexual risk-reduction programmes may help adolescents refine any inaccurate sexual health information that they may have obtained from friends or from social media. Furthermore, given the potential role of school socialisation in adolescent sexual behaviour (Kirby, 2002), it is likely that targeted attitude-based informational interventions, undertaken periodically, may help address key antecedents of attitude formation regarding adolescent sexual behaviour among high school students in the eastern region of Ghana. The formation of positive sexual attitudes among early adolescents may trigger positive intentions to engage in protected sexual behaviour.

In addition, we found a statistically significant association between perceived behavioural control over condom use and intention to use condoms among this sample. This finding suggests that although high school students in the eastern region of Ghana (including the present sample) do not have access to free condoms on their school campuses and despite the social stigma associated with adolescent sexual behaviour in this setting, the majority of our participants reported perceived control over these barriers to condom use. Consequently, to strengthen self-efficacy beliefs about condom use, safe sex interventions among adolescents in the eastern region of Ghana could incorporate sexual assertiveness training and condom use skills training. These safe sex interventions may help equip both sexually experienced school
youths and those who are about to commence sexual activity with relevant safe sex attitudes and control beliefs.

**Limitations of this study**

The limitations of this study include the use of a purposive sampling technique to recruit the sample and the use of self-report data. First, the sample was recruited from one large municipal, public high school out of several public high schools in the eastern region of Ghana. Consequently, these findings may not generalise beyond the present sample. Nevertheless, the patterns and frequency of sexual risk behaviour involving young people in the current study’s setting may compare favourably with those from other public high school youths reported in the youth sexual behaviour literature, from other geographical locations in Ghana (Adu-Mireku, 2003; Karim et al., 2003; Morhe et al., 2012; Odonkor et al., 2012; Ohene & Akoto, 2008). Future research may benefit from participants drawn from many public and private high schools in Ghana.

Second, as with several prior studies reported in the youth sexual behaviour literature, the data reported on in this study were obtained through self-report measures. Although it is well known that bias may attend self-report measures, especially when private sexual information is sought, a growing body of research has shown that the use of self-report data in sexual behaviour research does not pose major problems (DiClemente, Swartzendruber, & Brown, 2013; Goldberg, Haydon, Herring, & Halpern, 2014; Schroder, Carey, & Vanable, 2003). Despite this, it was possible that our self-report data may have had some influence on our analysis.

**Conclusions**

This study aimed to understand the determinants of condom use to prevent sexually transmitted HIV and unintended pregnancy among school-going adolescents in the eastern region of Ghana. Despite the limitations associated with this study, the model fit statistics (i.e. the measurement and structural models) were generally good. We found that, among this sample, attitudes, perceived behavioural control, and intentions are salient to adolescent condom use. Normative beliefs are not salient for condom use among this sample. Our results, thus, highlight the importance of using behavioural beliefs, perceived control beliefs and intentions as key variables in heterosexual HIV transmission risk reduction programmes and interventions in the eastern region of Ghana.

**Acknowledgment**

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**Disclosure statement**

No potential conflict of interest was reported by the authors.

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References


