Understanding Emergency Contraception Practice in Ghana: A Theory-Based Approach

Abstract

This analysis employs structural equation models to test whether the theory of planned behavior (TPB) can be applied to explain intended use and provision of EC among family planning (FP) clients and by providers in Kumasi, Ghana. We use data from two cross-sectional surveys conducted in Kumasi in 2008; interviews were conducted with 992 clients attending the FP clinic at Komfo-Anokye Teaching Hospital and 600 FP providers. Extended TPB models including socio-demographic characteristics, EC knowledge and either experiential (for clients) or work-related (for providers) variables explain 34% and 36% of the variance in clients' and providers' behavioral intentions, respectively. Clients' perceived behavioral control over using EC and providers' attitudes toward EC appear to be the most important predictors of their intentions to use and offer EC, respectively. Personal forces are stronger than social forces when it comes to self-reported intentions to use or provide EC in Kumasi, Ghana.

Note: While we initially planned to have only one paper, we realized that it is impossible to include all the analyses in one paper; therefore, we have two papers: a 1st paper uses the provider data and a 2nd paper uses the client data. Our presentation will include results from both papers and we apologize for any inconvenience this might create.

Title:

An application of the theory of planned behavior to understand provision of emergency contraception in urban Ghana

Authors:

Andreea A. Creanga (MD)[1], Hilary M. Schwandt (MHS)[1], Saifuddin Ahmed (MBBS, PhD)[1], Kwabena A. Danso (BSc, MB ChB, FWACS, FGCS)[2,3], Amy O. Tsui (PhD)[1]

Affiliations:

[1]Population, Family, and Reproductive Health Department
Johns Hopkins Bloomberg School of Public Health
Baltimore, USA
[2] Department of Obstetrics and Gynecology
Komfo Anokye Teaching Hospital
Kumasi, Ghana
[3] School of Medical Sciences
Kwame Nkrumah University of Science and Technology
Kumasi, Ghana

Corresponding author:

Andreea A. Creanga
Population, Family, and Reproductive Health Department
Johns Hopkins Bloomberg School of Public Health
615 N. Wolfe Street, Room W4513
Baltimore, Maryland 21205-2179
email: **acreanga@jhsph.edu**
Tel: 443-275-3439
Fax: 410- 955-0792

Key words: theory of planned behavior, emergency contraception, providers, Ghana

Introduction

The Theory of Reasoned Action (TRA), developed by Fishbein and Ajzen (Ajzen and Fishbein, 1980**;** Fishbein and Ajzen, 1975), addresses the impacts of cognitive components, such as attitudes, social norms, and intentions, on behaviors. According to this theory, individuals' attitudes toward a certain behavior and norms representing their perception of other people's view of such behavior will determine their behavioral intentions, which may further lead to performance of the behavior. Since behaviors that are not fully volitional are also influenced by the individual's perception of his or her ability to perform the behavior, Ajzen extended the TRA by adding the perceived behavioral control as an additional predictor of behavioral intentions. A new theory named the Theory of Planned Behavior (TPB) was thus developed (Ajzen, 1985). It proposes that the intention to perform a particular behavior is the most immediate and important determinant of future behavior, but also recognizes that non-motivational sources, in the form of perceived behavioral control, may predict behavior directly if people have a realistic perception of their actual behavioral control (Ajzen, 1991). As a general rule, the more favorable the attitudes toward behavior and subjective norms, and the greater the perceived behavioral control, the stronger the person's intention to perform the behavior in question should be. Finally, given a sufficient degree of actual control over the behavior, people are expected to carry out their intentions (Ajzen, 2002).

The TRA and TPB have been successfully applied to a variety of behaviors and increasingly to health behaviors (Shepperd et al., 1988; Godin and Kok, 1996; Hausenblas, 1997; Armitage and Conner, 2001; Connor and Sparks, 2005). A number of meta-analyses have demonstrated the predictive efficacy of these models in explaining variation in behavioral intentions, self-reported

behaviors and objective/observed behaviors (Armitage and Conner, 2001). As such, a recent review of 20 studies detailing the use of TRA or TPB and their effect on clinicians' behavior was conducted by Perkins et al. in 2007. Eight articles describe the use of TRA or TPB with physicians as subjects, four articles relate to nurses, three articles relate to pharmacists, and two articles relate to other health care workers. Among physicians, the earliest study involving TRA or TPB was conducted in 1992 by Kinket et al. who examined 49 general practitioners to determine how their attitudes, subjective norms, and perceived behavioral control were related to their intentions and self-reported behavior of informing patients about the nature of their illnesses and about treatment methods; by using the TPB, Kinket et al. (1992) determined that attitudes were the strongest predictor of intentions, while social norms and behavioral control did not increase the predictive power of the model. Attitudes were also found to be the strongest predictor of intentions in Limbert and Lamb's (2002) study of physicians' use of a guideline for antibiotics. However, Limbert and Lamb found that subjective norms were the strongest predictor of junior physicians' use of an asthma management guideline.

Other TRA or TPB-based studies of physicians' behavior (Taylor et al., 1994; Gaither et al., 1996; Millstein, 1996; Bunce and Birdi, 1998; Walker et al., 2001; Liabsuetrakul et al., 2003) demonstrated important variations in results, depending on the specific behavior being studied and on the type of physicians. For example, Gaither et al. (1996) demonstrated that social norms were the predominant determinant of use of drug information by physicians in health maintenance organizations, and Bunce and Birdi (1998) found social norms to be the strongest predictor of doctors' intention to request hospital autopsies. In contrast, Millstein (1996) found perceived behavioral control to be the strongest predictor of a primary care physician's intention

to educate adolescents about sexually transmitted infections. Only one study has applied a theoretical approach (TRA) to explain physicians' intention to prescribe emergency contraception (EC). The study included 94 faculty physicians in US, and found that, consistent with the TRA, high intention to prescribe EC was associated with positive attitudes and strong perception that specific colleagues and professional groups support its provision; however, physicians' knowledge about EC and demographic characteristics were not significant predictors of their intention to prescribe EC (Sable et al., 2006).

In the field of nursing, four studies examined the extent to which TRA or TPB predicted nursing behaviors, such as care for HIV-positive patients (Laschinger and Goldenberg, 1993), care for patients with chronic pain (Edwards et al., 2001), and the delivery of smoking cessation advice (McCarty et al., 2001; Puffer and Rashidian, 2004). As with the physician studies, TRA or TPB factors, such as attitudes, subjective norms and perceived behavioral control were strong predictors of the particular behavior in these various studies. TPB has also been utilized to examine the behavior of other health care professionals. For example, two studies examined pharmacists' practices by using TPB constructs (Mashburn, 2004; Walker et al., 2004), and another used TPB components to develop a causal model to address the delivery of pharmaceutical care (Farris and Schopflocher, 1999). As with the studies of physicians and nurses, studies of pharmacists and other health care workers (e.g. laboratory technicians) also suggested that the constructs of the model and the constructs' correlation to intentions and behavior varied on the basis of the particular behavior and the group of cadres being studied (Levin, 1999; Farris and Schopflocher, 1999; Jenner, 2002; Mashburn, 2004; Walker et al., 2004).

The availability of EC and its potential to decrease the number of unintended pregnancies in a country like Ghana where only a few women use reliable methods of contraception and many rely on abortion to regulate their fertility prompted an examination of the intention to provide EC by family planning (FP) providers and pharmacy workers in this country. Intention has been characterized as the most significant predictor of individual behavior and reflects the degree of motivation to engage in specific actions (McCaul et al., 1988; Brubaker et al., 1990; Ajzen, 1991; Martin et al., 1999; Lauver et al., 1999; Furnham and Lovett, 2001). Our study examines how the TRA, its extension, the TPB, and an extended TPB (ETPB) model may be applied to explaining FP providers' intention to offer EC to clients in urban Ghana and their comparative advantages. Specifically, the study aims to: (1) assess the influence of facility- and work-related characteristics on Ghanaian providers' intention to offer EC, and (2) assess the validity and utility of applying the TRA, TPB, and ETPB models to explaining FP providers' intention to offer EC to clients in urban Ghana

Methods

Analytical model

In a comparison of the TRA and TPB models, Madden and Ajzen (1992) confirmed that the magnitude of differences in the predictability of behavior varied as a function of the degree of perceived control over the behavior -- for those behaviors that were viewed as being highly controllable, differences between the TRA and TPB in predicting behavior were slight or nonexistent. Other comparisons of the TRA and the TPB have shown that the addition of perceived control to the model improves its predictability when behaviors are volitional or affected by external controls (Netemeyer et al, 1991; Richard and Dedobbeleer, 1994; Armitage

and Conner, 2001). Thus, perceived behavioral control over opportunities, resources, and skills necessary to perform a behavior is believed to be a critical aspect of behavior decision-making processes such as EC provision. Therefore, we have chosen to use the TPB over the TRA model to build our study's analytical framework.

The TPB is one of the most thoroughly tested and robust of the psychological models. Intention, attitudes (AB), subjective norms (SN), and perceived behavioral control (PBC) have been identified by health behavior theorists as four of the eight variables believed to account for most of the variance in any given behavior; the other variables being environmental constraints, ability, self-standards, and emotion (Fishbein et al., 1992). The strength of the theoretical approach to understanding human motivation based on Azjen's TPB (1985) and Bandura's social cognitive theory (1977) is that it provides a means of understanding both intrapersonal underlying reasons for the behavior and reasons emanating from the individual's relationship with others or from perceived normative pressure. Understanding individual beliefs and motivations is important in itself, but because these beliefs are also formed and shaped by external forces, it is equally necessary to account for both individual and group influences (Fishbein et al., 1992; Bandura, 1977). Based on this theoretical perspective, in this study providers' intention to offer EC is assessed as a function of their attitudes toward EC, their perceived social norms related to EC and control over its provision.

One of the attractions of the TPB is that it provides a relatively parsimonious model of the proximal determinants of individuals' decisions (i.e. intentions). However, Ajzen (1991) conceded that: "the theory of planned behavior is, in principle, open to the inclusion of additional

predictors if it can be shown that they capture a significant proportion of the variance in intention or behavior after the theory's current variables have been taken into account." A number of researchers have proposed that further variables are added to the model to increase its predictive utility (Conner and Norman, 1994; Conner and Armitage, 1998; Puffer and Rashidian, 2004). As such, our analytical model takes into account the existence of other variables (e.g. socio-demographic, work-related) as distal factors that influence behavioral intention through the main three constructs (AT, SN, PBC) of the TPB model. Moreover, we hypothesize that work-related variables predict not only the way providers form their attitudes toward EC, comply to related subjective norms and perceive their control over this specific behavior, but have also a direct effect on their intention to provide EC.

Several authors have tried to test whether providers' knowledge adds to either TRA- or TPB–based models in explaining their behavioral intentions and actual behaviors, and have obtained mixed results. Although we acknowledge that information in the form of behavior-relevant beliefs is a central component of the standard TPB, it is important to examine whether technically *correct* information works for or against intention to perform a certain behavior. Thus, knowledge is added as a distinct distal variable to our model. We are further interested in the distinction between two domains of knowledge: providers' theoretical and practical knowledge about EC. We hypothesize that the two domains are correlated and their individual effects on intention mediated by the three TPB components (AT, SN, PBC). The fact that interventions to raise knowledge have been shown to increase EC provision by health care providers further supports our inclusion of EC knowledge as a separate distal component of our

extended, ETPB model (Sable et al. 2006). Relationships between variables/constructs for testing the TRA, TPB and ETPB are depicted in Figure 1.

Data

This analysis uses health provider data collected between March and June 2008 during a census of hospitals, clinics, maternity homes and pharmacies offering FP services in Kumasi, Ghana. We used comprehensive lists of clinics and pharmacies offering FP in Kumasi in 2007 that were provided by the Ghana Health Services and the Ghana Pharmacy Council, respectively, and updated in the field. Overall, we visited 38 clinics and 203 pharmacies and conducted in-depth interviews with 154 health clinic- and 446 pharmacy-providers of FP services. We interviewed all providers present in the facility at the time of a first visit, obtained the total number of providers working in each facility and conducted a second visit to facilities where more providers could have been interviewed; the final sample size rendered by our approach was 600. Our interviewers were permitted to interview providers in 93.8% of all clinics and pharmacies, and across those facilities, about 92.2% of all identified providers were interviewed.

The survey questionnaire was administered by trained, college-graduate interviewers, and collected data on socio-demographic characteristics, facility- and work-related variables, providers' training and knowledge of EC, as well as on scale items to measure the TPB components (AT, SN, PBC, intention). We had about 2% of missing data on one or more of the scale items and we used an item mean substitution technique to replace missing values in all cases (Little and Rubin, 1987; Cohen et al, 2003). This approach reduces the variation in responses and potentially supplies purely neutral views of non-respondents with non-neutral

opinions. However, the approach has theoretical validity under the assumption that data are missing at random.

The study was approved by the Committees of Human Research at Johns Hopkins Bloomberg School of Public Health, Baltimore, USA and at Komfo-Anokye Teaching Hospital, Kumasi, Ghana.

Measures

Instruments based on the TRA or TPB have been developed to measure behavioral intentions and actual behaviors. Sable et al. (2006) have developed such an instrument trying to assess whether the TRA can be used to explain provision of EC by a convenience sample of faculty physicians in US. To our knowledge, there are no other published instruments to measure behavioral, normative or control beliefs about provision of EC either in developed or in developing countries. Therefore, our scale items for providers' attitudes, norms toward and intention to offer EC were inspired by the previously developed scales of Sable et al (2006) to which we have added several items pertaining to the somewhat distinct FP practice-related aspects in developing countries. Additionally, we developed theoretically derived measures of perceived behavioral control following the TPB-based questionnaire development protocols proposed by Ajzen (2004) (Sable et al. used the same protocols to develop the TRA-based questionnaire modules for their study). All elements of the questionnaire which might influence providers' control over offering EC were either identified from the literature, represented opinions of the clinical members of the research team or were obtained through feedback during the scale item elicitation process conducted with FP nurses working at Komfo-Anokye Teaching Hospital. Two corresponding

scale items were developed for each attitude, norms and control beliefs – one measured the strength of the belief, and the other measured evaluation of the belief (Ajzen, 2002). All TPB components (AT, SN, PBC and behavioral intentions) were measured on a 7-point Likert scale as recommended by several authors (Logue et al., 1988; Netemeyer et al., 2003; Ajzen, 2004). The EC knowledge questions used were similarly inspired by the Sable et al. study questionnaire to which we have added questions pertaining to the practical aspects surrounding EC provision. All acceptable correct answers are evidence-based.

Direct and indirect measures for all elements of the TPB were available. The direct measures for AB, SN, PBC and behavioral intention were based on one, two or three items that directly solicited from respondents to rate their attitudes, subjective norms, perceived control over behavior and their intention to provide EC. Responses ranged from 1="extremely bad, negative or harmful to provide EC" to 7="extremely good, positive or beneficial to provide EC" for attitudes, from 1="definitely should not provide EC" to 7="definitely should provide EC" for norms, and from 1="strongly agree" to 7="strongly disagree" for perceived control and behavioral intentions.

The indirect measures were scales with seven items for attitudes, four items for norms, and five items for behavioral control and intention to provide EC.

Provider attitude scale: The seven items included in the scale were related to the possible outcomes of offering EC: 1) enhance a woman's reproductive options, 2) reduce the number of unintended pregnancies, 3) reduce the number of abortions, 4) not discourage consistent use of other contraceptives, 5) not encourage unprotected sex, 6) not pose health risks to women, and 7)

not cause an abortion for a woman who has conceived. Participants were asked how likely each of these beliefs was to be true for them, and answers ranged from 1="extremely unlikely" to 7="extremely likely". In addition, participants were asked how good or bad each of these outcomes is and answers ranged from 1="extremely bad" to 7="extremely good". An individual score on this scale was computed by first multiplying each item assessing beliefs about the outcomes by the evaluation of the outcomes; product scores were then summed across all items for a total score for each respondent. The total scale score ranged from a minimum of 7 to a maximum of 343.

Provider subjective norms scale: Four scale items assessed providers' beliefs about whether specific professional referents think they should offer EC and answers ranged from 1="definitely should not" to 7="definitely should". The four specific referents were colleagues, professional organizations, medical standards of professional practice and the Ministry of Health. Providers were also asked how much they want to comply with each referent (1="not at all" to 7="very much"), and for the final score we weighted individuals' beliefs about the specific professional referents by their motivation to comply with those referents. The total scale score ranged from 4 to 196.

Provider perceived behavioral control scale: The four items in this scale represented providers' beliefs over the frequency (1="very frequently" to 7="never") with which they encounter five identified barriers to EC provision: self-assessed knowledge, specific training, EC shortages, EC cost and clients' demand for EC. We also measured how easy providers considered it was to provide EC in the context of the identified barriers (1="much easier" to 7="much more difficult"). The total score for this scale ranged from 5 to 245.

Provider intention to offer EC scale: The five items in this scale addressed the extent to which providers intend to offer EC to each of the following five groups: 1) women who specifically asked for EC, 2) women who experienced incest or rape, 3) women who experienced a problem with their method, 4) sexually active teenagers, and 5) women who had unprotected sexual intercourse. Responses were given on a seven-point Likert scale (1="not at all" to 7="very much"), and scores for this scale ranged from 5 to 245.

The socio-demographic characteristics used in the analyses were: provider's gender, age and education measured continuously in completed years, religion categorized as Catholic, Anglican/Methodist/Presbyterian, other Christian and Muslim, and ethnicity categorized as Akan or other. The facility- and work-related variables used were: health sector (private/public), type of facility (pharmacy or hospital/clinic/maternity home), position level categorized as higher (pharmacist, nurse, midwife, doctor) and lower (medical assistant, pharmacy assistant, technician), number of health services offered, number of FP clients in the last month (logged), number of weekly hours worked, number of months of experience as an FP provider categorized as less than 6 months, 6-23 months and 2 or more years, whether the provider ever received in-service training on EC, was working in another health facility or had another occupation at the time of the survey, the latter three measured as binary (yes/no) variables. Variables to measure EC theoretical and practical knowledge about EC were constructed as the sum of correct answers to 11 questions on knowledge of EC as a contraceptive method and 8 questions on EC provision-related aspects.

Analyses

<u>Scale development for Theory of Planned Behavior components</u>

We have recoded the items in all scales to have negatively worded endpoints on the left, so that the higher numbers always reflect positive attitudes, norms, control and intention toward the target behavior. We computed correlations between direct and indirect measures of the TPB model components to ensure content validity, and between each of the three mediating-components of the TPB (AT, SN, PBC) and intention to provide EC. Additionally, within each scale, items were dropped when inter-item correlations were either below 0.25 or greater than 0.70 (Kerlinger, 1986). We then conducted a series of exploratory factor analyses (EFA) in order to identify the underlying dimensions in the scale and reduce the number of items in each scale so that the remaining items maximize the variance explained and scale's reliability (Netemeyer et al., 2003). The structure of the scales was tested using principal component analysis (PCA) as the extraction method to reduce the number of variables into more parsimonious and manageable factors (Tabachnick and Fidell, 2001). We retained one factor for all scales, a decision based on the Kaiser criteria (eigenvalues > 1) and the scree test/plots (Velicer and Jackson, 1990), and thus confirmed the unidimensionality of scales. An item was considered to belong to a given component if its loading (correlation between the variables and the underlying factor) was higher than 0.40 (Tabachnick and Fidell, 2001), and less than 0.90 (Netemeyer et al., 2003). Cronbach's alpha was computed to verify the internal consistency of the TPB constructs as it has been found to be a robust statistic (Sideridis, 1999), and factor loadings for the factor solution were recorded.

Similar EFA steps were followed to confirm the unidimensionality of the knowledge theoretical and practical scores. After obtaining predicted values from factor analysis, knowledge variables

were standardized. Additionally, we constructed theoretical and practical knowledge scores as the sum of correct answers provided to the eleven EC theoretical and eight EC practical knowledge question-items identified by the EFA. Given that we obtained similar results with both types of measures, we decided to show the results using the more easily interpretable measure, the summed score. Analyses in this phase were carried out using Stata version 9.1 (Stata Corporation, College Station, TX).

Structural equation modeling

The proposed relationships between constructs as delineated by the TRA, TPB and ETPB conceptual models (Figure 1) were examined through structural equation modeling (SEM), with Mplus software, version 5 (Muthén and Muthén, 2001). SEM is chosen because this approach is superior to OLS techniques in its capacity to assess the adequacy of theorized models and in comparing models. The key feature of this approach is the assumption of the existence of latent variables, not observed directly but instead expressing themselves through responses to survey items. Any one of these items may be imperfectly measured, but collectively they are assumed to provide an adequate representation of the unobserved variable (Byrne, 2006). This technique consists of two interrelated components: a measurement model and a structural model. The measurement model specifies how the latent constructs are indicated by their observed indicators, and the structural equation model specifies causal relationships among observed and latent variables and describes their direct and indirect effects.

Mplus allows the use of both continuous and categorical variables as independent and dependent variables. In our models, we had a mixture of continuous and binary variables. Mplus analyzes

the correlation matrix of all variables, and parameters in the models were estimated according to the weighted least square method (WLS estimator) (Muthén and Muthén, 2001). Correlations among variables were measured by polychoric correlation (when both variables were categorical) and polyserial correlation (when one of the variables was categorical and the other was continuous) instead of Pearson's product-moment correlation. With binary variables in the model, the estimation by WLS method produces asymptotically correct estimates with large samples. The WLS method is considered to generate the "asymptotically distribution free best estimators" (Browne, 1984). In this method, the inverse of the asymptotic covariance matrix of polyserial estimates is supplied as the weight for least square estimates (Browne, 1984; Ahmed and Mosley, 2002). The asymptotically distribution-free estimates are considered to be robust to violations of the assumption of normality (Browne, 1984; Ahmed and Mosley, 2002).

Five measures of overall goodness of fit were used to determine how well the models fit the data: chi-square ($\chi 2$), mean square error of approximation (RMSEA), standardized root mean square residual (SRMSR), the comparative fit index (CFI) and the Tucker-Lewis index (TLI). The $\chi 2$ test assesses whether there is a statistically significant difference between the covariance matrix implied by the hypothesized model and the covariance matrix of the observed variables in the population; a non-significant $\chi 2$ indicates a good fit (Bollen and Long, 1993). However, because the chi-square is heavily influenced by sample size (Bollen and Long, 1993), several fit indices have been proposed as aids to model fitting (Bentler, 1990, 1998; Joreskog and Sorbom, 1981, 1993). A value of RMSEA <0.05 indicates very good fit, and values up to 0.08 indicate reasonable errors of approximation in the population. SRMSR has been shown to be sensitive to model misspecification and its use is recommended by Hu and Bentler (1999); values less than

0.08 are considered to be indicative of acceptable model fit. The fit index that has been suggested as most appropriate is the CFI; it has a small sampling variability and appears to be unaffected by sample size (Bentler, 1990; Garrett et al., 1994). For validity purposes, CFI and TLI with values over 0.95 are considered acceptable for a good model fit (Bentler, 1990; Hays et al., 1994).

Path coefficients depicted in the models are analogous to standardized regression coefficients. The standardized path coefficients serve as estimates of the relative importance (weights) of the predictors. Based on the statistical significance of the coefficients of structural parameters we were able to identify key predictors of providers' intention to offer EC. We also identified the effects of socio-demographic, EC knowledge and work-related variables on intention to provide EC and report how much of the variance in intention is accounted for by the modeled predictor variables comparatively between the TRA, TPB and ETPB models.

Results

Table 1 shows the socio-demographic, facility- and work-related characteristics of providers in our sample. More of the interviewed providers are females (54.3%) and the Akans are the dominant ethnic group (88.5%); providers' mean age is 33 years and they have, on average, 14 years of education. About three quarters of surveyed providers work in pharmacies, and 83.7% of our sample is comprised of providers working in the private sector. Interestingly, 72.0% of them have less than two years of experience in offering FP services and only about one third of them had received specific in-service training on EC (32.4%). Interviewed providers answered

correctly an average of 4.1 of the 11 questions on theoretical knowledge of EC and 5.6 of the 8 questions on EC provision.

Table 2 lists the items in the TPB-based scales, the mean and standard deviations of the scale scores and the estimates of internal consistency reliability (Cronbach's alpha), all of which are higher than 0.7. All scales were scored so that high scores reflected a positive disposition toward intention to provide EC.

Table 3 shows the summary of fit statistics comparing the TRA, TPB and ETPB structural equation models. While the chi-squared tests are statistically significant and thus, indicative of poor fit for all models, this situation is likely due to the relatively large sample size as proven by Bollen and Long (1994). Overall, the other fit indices show that all models TRA, TPB and ETPB provide a good fit to the data. The CFI, TLI and RMSEA indices for the ETPB model are slightly lower than for the TRA and TPB models, but they still indicate an adequate model fit. On the other hand, the ETPB model explains more of the variance in health care providers' intention to offer EC (36.4%) than either the TPB (29.1%) or the TRA (17.2%) models.

Figures 2a and 2b depict the structural TRA- and TPB-based models with standardized coefficients shown for each path. The data does not support applying the most simple, TRA-based model to explain intention to offer EC by health care providers in Ghana – the estimated structural model identifies a positive and significant correlation between subjective norms and intention to provide EC but no relationship between attitudes toward and intention to provide this method. With the introduction of the PBC construct, the three TPB components (AT, SN, PBC)

are significantly and positively related to providers' intention to offer EC to clients; this TPB-based model recognizes favorable attitudes toward offering EC as the strongest and perceived control over providing EC as the second strongest predictor of providers' intention to offer EC. Thus, adding the PBC construct, thus extending TRA to TPB, increases the predictive power of the structural model to explain Ghanaian providers' intention to offer EC.

Figure 3 shows the structural ETPB-based model, the standardized coefficients for *all* paths between the TPB elements (AT, SN, PBC, intention) and the *statistically significant* standardized coefficients for the paths involving the distal variables (TPB model extensions). As with the TPB-based model, attitudes and behavioral control have a direct, significant and positive influence on FP providers' intention to offer EC, relatively more so for attitudes than behavioral control; however, providers' perceptions of the social norms to offer EC no longer predict their intention to do so. Ajzen proposed that AT, SN and PBC constructs are all correlated with each other. In our ETPB only SN and PBC constructs are significantly and positively correlated, while their individual relationship with attitudes toward offering EC is confounded by the proposed model extensions. Overall, as shown in Table 3, the ETPB model explains more of the variance in EC provision intention than either the TPB or the TRA, and given that all models have good fit indices, the ETPB represents our model of choice.

The ETPB structural model identifies two positive, direct work-related determinants of intention to provide EC by health care providers in Kumasi. It appears that providers offering more services and having more than two as opposed to less than two years of experience in FP increase the likelihood of their intending to offer EC. Additionally, other distal factors are shown

to indirectly influence providers' intention to offer EC, their effects being mediated by attitudes, subjective norms and/or behavioral control. Among the socio-demographic variables included in the structural model, providers' Catholic rather than *other Christian* religion influences their control over offering EC; non-Akan ethnicity is negatively related to all three mediators (AT, SN, PBC) of the intention to provide EC; higher age is negatively correlated with social norms and control over offering EC; and higher education is a positive predictor of providers' control over EC provision. Providers' higher theoretical EC knowledge positively influences both attitudes toward and control over offering EC to clients, while their greater practical EC knowledge is associated with unfavorable attitudes toward EC provision and with perception of social norms that encourage EC provision. Interestingly, theoretical and practical EC knowledge are positively correlated. Working in a clinic rather than a pharmacy increases the likelihood of providers having positive attitudes toward offering EC. Conversely, having received specific in-service training on EC is associated with providers' less favorable attitudes toward offering EC, but also with perceived supportive social norms vis-à-vis EC provision. Highly qualified providers working on higher than lower-level positions seem to feel less pressured by EC provision-related social norms and more in control of offering EC than their counterparts.

Discussion

TPB has received considerable attention in the literature. However, within the health arena the application and testing of theoretical models have almost exclusively focused on predicting behavioral intentions and behaviors of patients. The present study adds to the body of literature confirming the utility of TPB and TPB-based models to understanding behavioral intentions of

health care workers. No previous published study has applied a psychosocial theory to understand providers' EC practice in a developing country.

We compare the efficacy of the TRA, TPB and ETPB to explain FP providers' intention to offer EC using structural equation modeling. This methodological tool allows straightforward translation of scientific theory to statistical models and results in a quantitative snapshot of the dynamic relationship among variables. The adequacy of each model was judged on the basis of model fit and explanatory power. All models adequately fit the data; the slightly lower fit indices for the ETPB model are likely due to the considerable higher number of parameters estimated in this model relative to the other two models. The TPB model is supported by the data as the three theoretical constructs (AT, SN, PBC) are all significantly related to FP providers' intention to offer EC. The ETPB-model is only partially consistent with the underlying assumptions of the TPB and suggests that attitudes and perceived behavioral control are significant determinants of Ghanaian providers' intention to offer EC, while the perceived social norms related to such provision are not. That is, intentionally or unintentionally, FP providers in Ghana act the way they think most of the time. Attitudes are formed having in mind the consequences of a behavior and seem to be closely linked to the formation of one's behavioral intention. In sum, it appears that personal forces are stronger than social forces when it comes to providers' self-reported intention to offer a contraceptive method such as EC.

Our results are broadly in line with those found by several meta-analyses which summarized results from various but not exclusively health-related TPB applications. We find that our application of the TPB and ETPB models explains 29% and 36%, respectively, of the variance in

FP providers' intention to offer EC in Kumasi, Ghana. A recent meta-analysis (Armitage and Conner, 2001) of 185 studies published up to the end of 1997 showed that TPB accounted for 39% and 27% of the variance in behavioral intentions and behaviors, respectively. This analysis was an update of another systematic review of TPB applications restricted to the domain of health which was conducted by Godin and Kok in 1996. Their results indicated that the theory performs very well for the explanation of health-related behavioral intentions (average R^2=0.41) and behaviors (average R^2=0.34). In both reviews, attitudes toward the action and perceived behavioral control were most often the significant variables responsible for the explained variation in behavioral intention, while the subjective norm construct was generally found to be a weak predictor of intentions. Armitage and Connor (2001) consider this latter finding attributable to a combination of poor measurement and the need for expansion of the normative component. Authors of both reviews concluded that the efficiency of the TPB varies greatly between behaviors.

Millstein (1996) compared the ability of the TRA and TPB in predicting physicians' intentions and subsequent behavior in relation to educating their adolescent patients about STD-HIV transmission. They found the TPB model to be superior in predictive power, accounting for an additional 12% of the variance in physicians' behavioral intentions and 2% of the variance in subsequent behavior. Madden et al. (1992) examined 10 different behaviors and reported this difference in explanatory power between the two models as ranging from a low 1% for highly controllable behaviors to 28% for behaviors under less volitional control. In our study, the magnitude of this difference in the percentage of variance explained by the TPB and TRA (12%)

falls approximately in the middle of the range described by Madden, matching that in Millstein's study.

Among all the TPB applications seeking to explain providers' behavioral intentions and behaviors, the application by Walker et al (2004) is the closest related in topic to our study; the authors used the TPB to explore the psychological variables that influence community pharmacists' intention to supply non-prescription antifungals for the treatment of vulvovaginal candidiasis in Grampian, Scotland. They found that pharmacists did not feel under social pressure to recommend antifungals and identified attitudes as the best predictor of the intention to offer these drugs. Additionally, this study showed that despite their strong intentions, only half of the interviewed pharmacists responded appropriately to four scenarios related to actual provision of antifungals. Thus, Walker et al. concluded that factors within the pharmacy setting and specific knowledge are also important in pharmacists' decision making. In light of such conclusion, it is not surprising that our extended TPB model (ETPB) explained an additional 7% in the variance in providers' intention to offer EC when compared to the TPB model. Other authors have also proposed extensions to the TPB model to examine various behaviors and a few of them have compared the TRA with the TPB and various TPB-based extensions in a health-related domain. Levin (1999) identified predictors of health care workers' glove use among a random sample of nurses and laboratory workers using structural equation modeling techniques; they found that attitudes and perceived behavioral control were the significant determinants of intention to use gloves, while one of their proposed extensions, perceived risk of viral contamination through blood, was a significant predictor of actual glove use.

Based on our proposed ETPB, we have identified factors directly and indirectly related to Ghanaian providers' intention to offer EC. Importantly, providers' experience and the number of services they offer are directly related to their intention to offer this particular service. It appears that when experienced and used to offering multiple services, providers' decision to offer EC is no longer mediated by attitudes, social norms or behavioral control, but routine practice.

Theoretical and practical knowledge are positively correlated, the former being a predictor of favorable, while the latter a determinant of unfavorable attitudes toward EC. First, this finding supports our hypothesis that the two domains of knowledge are quite different. Second, it appears that providers who are more knowledgeable about EC appreciate the method to be effective given that they correctly know when to recommend it and who should be using it; additionally, these providers have greater confidence in their ability to provide the method to clients. In contrast, providers with good practical knowledge who may know how to prescribe the method but not necessarily the correct window of time after unprotected sex when the method can work, for example, are more inclined to have neutral or negative attitudes toward EC; on the other hand, having practical knowledge of EC predicts providers' perception of being socially encouraged to provide EC. Sable et al. (2006) did not show that specific EC knowledge adds to the TRA model they applied to understand physicians' EC practice in US. The difference between their findings and ours may stem from three sources: (1) we consider the PBC construct to be crucial to modeling this particular behavioral intention and we test the efficacy of the TPB instead of the TRA; (2) we differentiate between two distinct domains of EC knowledge, and (3) we have different study settings and study populations: our study was conducted in a developing country where access to information is scarce and where medical and pharmaceutical practice are

poorly regulated (i.e. some of our pharmacy workers had only a few years of schooling, therefore, being likely less knowledgeable about EC than physicians offering this method in US).

Additionally, we show that other distal factors indirectly influence providers' intention to offer EC (their effects being mediated by AT, SN and PBC). Among these, interestingly, providers' age is found to be a significant predictor of a lower perceived control over offering EC; likely, this is because EC is a relatively new method in Ghana and providers may feel less confident to offering methods with which they have limited experience. Also, we find that providers working in a clinic as opposed to a pharmacy have more favorable attitudes toward offering EC. In the Ghanaian context where most FP supplies are obtained from pharmacies (Ghana Statistical Services and ORC Macro, 2002) it is likely that pharmacists are more aware of the use of inappropriate drugs for EC purposes, while FP clinic providers who can only supply the appropriate EC products might not know that certain drugs used for dysfunctional bleeding or treatment of amenorrhea have recently started to be widely used as EC in Ghana. Such a difference between the two categories of providers may lead to their different beliefs related to the effectiveness and use of EC.

We find that having received specific in-service training on EC is associated with providers' less favorable attitudes toward offering EC but also with perceived supportive social norms vis-à-vis EC provision. While explanations for the latter finding are obvious, the former finding is quite perplexing. It seems that providers who have been trained specifically on EC have developed negative views regarding the method – this might be due to either the specific aspects touched upon during training or to the quality of training. Incorrect information provided during training

(e.g. advance provision of EC leads to over use of the drugs, repeat use poses health risks, the drugs themselves pose health risks) could prompt providers to develop negative views on the method. How providers perceive the window of time when EC pills should be used may lead to some of them to consider it to be too short for women to access the pills in time – such consideration may lead to negative views on the benefits of this method. This anomalous finding on providers' perceptions warrants further investigation particularly given its practical consequences. It may be that providers' training should address the science behind the method and its prescription guidelines and the goal behavior as well as emphasize the possible benefits to patients, the health services and the community.

This study is not without limitations. Behavioral intention is an intermediate outcome that is hypothesized to predict ultimate behavior. Ajzen and Fishbein (1980) describe the relationship between intention and behavior as "tenuous, with longer periods of time between intention and behavior being less predictive of actual behavior". Due to its cross-sectional rather than longitudinal design our study can only explore providers' intention to offer EC but not their actual behavior. Thus, the true efficacy of the full TRA, TPB and, by implication, ETPB models cannot be tested here and conclusions about intentions cannot be interpreted as conclusions about actual behavior. Prospective studies are therefore needed to assess the predictive value of intentions to offer EC on actual EC provision in Ghana and/or other developing countries. Behavioral self-reports are contaminated by self-reports of cognitions, and often, by the tendency for some respondents to overstate performance of behaviors seen as socially desirable. Biases of this kind can inflate observed correlations between cognitions and reported behavioral intentions. However, as Petty and Krosnick (1995) suggest, it could not have been otherwise --

measurement of attitudes is by itself subjective and thus can be assessed only by self-report. The generalizability of our findings is limited to providers in urban areas of Ghana, and applications of the TPB and its various extensions in other settings are needed for external validation of our measures and results.

Importantly, structural equation models do not test directionality in relationships, and the directions of arrows in the ETPB represent our hypotheses of causality within the behavioral intention process we study. Therefore, our choice of variables and pathways limit the method's ability to recreate the sample covariance and variance patterns that have been observed in nature. This methodology can evaluate whether a causal hypothesis is consistent with empirical data; if not, the causal hypothesis can be rejected statistically; if yes, the causal hypothesis cannot be rejected although neither can it be "proven" by the methodology (Bentler and Stein, 1992). The model is susceptible to erroneous parameter estimates and model fitting if we have misspecified the true measurement and structural relationships.

Conclusions

Several authors have recognized that to be maximally effective, interventions aimed at changing behavior must not only address controllable and deliberate aspects of behavior but should seek to identify social, cultural, and contextual impediments to behavioral change (Eaton et al, 2003; Hulton et al, 2000). The proposed ETPB provides a valid and useful summary of the key variables that influence EC provision in Kumasi. Attitudes were the best predictor of intention, suggesting that interventions to strengthen or promote positive attitudes towards the supply of these drugs can potentially be effective in promoting its provision. Perceived behavioral control

was the second strongest predictor of these providers' intention to recommend EC and thus, interventions focusing on skill development are likely to also be helpful. However, we have shown that factors other than attitudes and behavioral control (e.g. knowledge, in-service training) also influence behavioral intentions and, potentially, practice, and these can also be targeted by educational/training behavior change strategies. Moreover, as a significant amount of variability remains unexplained; alternative theoretical frameworks may need to be examined and may be found extremely informative in further identifying promising pathways for increasing providers' adherence to medical standards and policies.

References

Ahmed S, Mosley WH. Simultaneity in the Use of Maternal-child Health Care and Contraceptives: Evidence From Developing Countries. Demography. 2002; 39 (1): 75-93.

Ajzen I. From intentions to actions. In: J. Kuhl and J. Beckman, Editors, Action Control from Cognition to Behavior, Springer Verlag, New York. 1985:11–39.

Ajzen I. Theory of planned behavior. Organ Behav Hum Decis Process. 1991; 50(2):179-211.

Ajzen, I. Perceived Behavioral Control, Self-Efficacy, Locus of Control, and the Theory of Planned Behavior. Journal of Applied Social Psychology. 2002; 32: 665-683.

Ajzen I. Construction of a standard questionnaire for the theory of planned behavior. 2004. Available at: http://www.unix.oit.umass.edu/-ajzen/

Ajzen I, Fishbein M. Understanding Attitudes and Predicting Social Behavior. Upper Saddle River: Prentice-Hall. 1980:1-278.

Armitage CJ**,** Conner M. Efficacy of the theory of planned behaviour: a meta-analytic review. Br J Soc Psychol. 2001; 40(Pt 4):471-99.

Bandura A. Self-efficacy: Toward a unifying theory of behavioral change. Psychoogical Review. 1977; 84: 191-215.

Bentler PM. Comparative fit indices in structural models. Psychol Bull. 1990; 107:238–46.

Bentler PM. EQS Structural Equations Program manual. Los Angeles, CA: BMDP Statistical Software Inc. 1998.

Bentler PM, Stein JA. Structural equation models in medical research. Statistical methods in medical research. 1992; 1(2):159-81.

Bollen KA, Long JS (Eds.). Testing structural equation models. Newbury Park, CA: Sage. 1993.

Browne MW. Asymptotic Distribution Free Methods in Analysis of Covariance Structures. British Journal of Mathematical and Statistical Psychology. 1984; 37: 62-83.

Brubaker RG, Wickersham D. Encouraging the practice of testicular self-examination: a field application of the theory of reasoned action. Health Psychol. 1990; 9(2):154-163.

Bunce D, Birdi KS. The theory of reasoned action and theory of planned behaviour as a function of job control. British Journal of Health Psychology. 1998; 3: 265–275.

Byrne BM. Structural equation modeling with EQS: basic concepts, applications, and programming, Lawrence Erlbaum Associates, Mahwah, NJ. 2006.

Cohen J, Cohen P, West SG, Aiken LS. Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences, 3rd edition. Mahwah, N.J.: Lawrence Erlbaum. 2003.

Connor M, Sparks P. Theory of planned behaviour and health behaviour. In Connor M and Norman P (Eds.). Predicting Health Behaviour: Research and Practice with Social Cognition Models. 2nd edn Buckingham, UK: Open University Press. 2005.

Conner M, Armitage C. Extending the theory of planned behavior: a review and avenues for further research. Journal of Applied Social Psychology 1998; 28: 1429–1464.

Conner M, Norman P. Comparing the health belief model and the theory of planned behaviour in health screening. In Rutter D and Quine L (Eds.). Social Psychology and Health: European perspectives.Aldershot, UK: Avebury. 1994.

Eaton L, Flisher AJ, Aaro LE. Unsafe sexual behavior in South African youth. Social Science and Medicine. 2003; 56(1): 149–165.

Edwards HE, Nash RE, Najman JM. Determinants of nurses' intention to administer opioids for pain relief. Nursing and Health Sciences. 2001; 3: 149–159.

Farris K, Schopflocher D. Between intention and behaviour: an application of community pharmacists' assessment of pharmaceutical care. Soc Sci Med. 1999; 49: 55–66.

Fishbein M, Ajzen I. Belief, attitude, intention and behavior: an introduction to theory and research, Addison-Wesley, MA. 1975.

Fishbein M, Bandura A, Triandis HC, Kanfer FH, Becker MH, Middlestadt SE. Factors Influencing Behavior and Behavior Change. Bethesda, MD, National Institute of Mental Health. 1992.

Furnham A, Lovett J. Predicting the use of complementary medicine: a test of the theories of reasoned action and planned behavior. J Appl Soc Psychol. 2001; 31(12):2588-2620.

Gaither CA, Bagozzi RP, Ascione FJ. A reasoned action approach to physicians' utilization of drug information sources. Pharmaceutical Research. 1996; 13:1291–1298

Garrett, P., Ferron, J., Ng'andy, N., Bryant, D., & Harbin, G. A structuralmodel for the developmental status of young children. Journal of Marriage and the Family.1994; 56: 147-63.

Ghana Statistical Services and ORC Macro. Final Report. Ghana Service Provision Assessment. 2002.

Godin G**,** Kok G. The theory of planned behavior: a review of its applications to health-related behaviors. Am J Health Promot. 1996; 11(2):87-98.

Hays RD, Marshall GN, Wang EY, Sherbourne CD. Four-year cross-lagged associations between physical and mental health in the medical outcomes study. Journal of Consulting and Clinical Psychology. 1994; 62, 441-449.

Hausenblas HA, Carron AV, Mack DE. Application of the theories of reasoned action and planned behaviour to exercise behaviour. A meta-analysis. J Sport Exerc Psychol. 1997; 19:36–51.

Hu L, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. Struct Equ Model. 1999; 6:1–55.

Hulton LA, Cullen R, Khalokho SW. Perceptions of the risks of sexual activity and their consequences among Ugandan adolescents. Studies in Family Planning. 2000; 31(1): 35–46.

Jenner EA, Watson WB, Miller L, Jones F, Scott GM. Explaining hand hygiene practice: An application of the theory of planned behaviour. Psychology, Health & Medicine. 2002; 7 (3): 311–326.

Jöreskog K, Sörbom D. LISREL V: Analysis of Linear Structural Relationships by the Method of Maximum Likelihood.Chicago: National Educational Resources. 1981.

Jöreskog KG, Sörbom D. Structural Equation Modeling with the SIMPLIS Command Language.Chicago: Scientific Software Inc. 1993.

Kerlinger FN. Foundation of behavioral research (3rd ed.). New York: Holt, Rinehart, & Winston. 1986.

Kinket B, Paans L, Verplanken B.Patient education by general practitioners: application of the theory of planned behavior. Gedrag and Gezondheid: Tijdschrift voor Psychologie and Gezondheid.1992; 20: 187–195.

Laschinger HS, Goldenberg D. Attitudes of practicing nurses as predictors of intended care behavior with persons who are HIV positive: testing the Ajzen-Fishbein theory of reasoned action. Research in Nursing and Health.1993; 16: 441–450.

Lauver DR, Settersten L, Marten S, et al. Explaining women's intentions and use of hormones with menopause. Res Nurs Health.1999; 22(4):309-320.

Levin PF. Test of the Fishbein and Ajzen models as predictors of health care workers' glove use.Res Nurs Health. 1999; 22:295-307.

Liabsuetrakul T, Chongsuvivatwong V, Lumbiganon P. Obstetricians' attitudes, subjective norms, perceived controls, and intentions on antibiotic prophylaxis in caesarean section. Social Science and Medicine. 2003; 57: 1665–1674.

Limbert C, Lamb R. Doctors' use of clinical guidelines: two applications of the Theory of Planned Behaviour. Psychology, Health and Medicine. 2002; 7: 301–310.

Little RJA, Rubin DB. Statistical analysis with missing data. New York, Wiley. 1987.

Logue AW, Logue CM, Uzzo RG, McCarty MJ, Smith ME. Food preferences in families. Appetite. 1988; 10: 169-180.

Madden PE, Ajzen I. A comparison of the theory of planned behavior and the theory of reasoned action, Personality and Social Psychology Bulletin. 1992; 18: 3–9.

Martin SC, Jacobsen PB, Lucas DJ, Branch KA, Ferron JM. Predicting children's sunscreen use: application of the theories of reasoned action and planned behavior. Prev Med. 1999; 29(1):37-44.

Mashburn JH. Using the Theory of Planned Behavior to predict Texas community pharmacists' willingness to provide sterile syringes to known or suspected intravenous drug users. Dissertation Abstracts International: Section B: Sciences and Engineering. 2003; 64:60-34.

McCarty MC, Hennrikus DJ, Lando HA. Nurses' attitudes concerning the delivery of brief cessation advice to hospitalized smokers. Preventive Medicine: An International Journal Devoted to Practice and Theory.2001; 33:674–681.

McCaul KD, O'Neill HK, Glasgow RE. Predicting the performance of dental hygiene behaviors: an examination of the Fishbein and Ajzen Model and self-efficacy expectations. J Appl Soc Psychol. 1988; 18(2):114-128.

Millstein SG. Utility of the theories of reasoned action and planned behavior for predicting physician behavior: a prospective analysis. Health Psychol. 1996; 15(5):398-402.

Muthén LK and Muthén BO. Mplus user's guide. (Second ed.), Muthén and Muthén, Los Angeles (CA). 2001.

Netemeyer RG, Burton S, Johnston M. Volitional and Goal-Directed Behaviors: A Confirmatory Analysis Approach. Social Psychology Quarterly. 1991; 54 (2): 87-100.

Netemeyer RG, Bearden WO, Sharma S. Scaling Procedures: Issues and applications. Sage Publications, Thousand Oaks, CA. 2003.

Perkins MB**,** Jensen PS**,** Jaccard J**,** Gollwitzer P**,** Oettingen G**,** Pappadopulos E**,** Hoagwood KE. Applying theory-driven approaches to understanding and modifying clinicians' behavior: what do we know? Psychiatr Serv. 2007; 58(3): 342-8.

Petty RE, Krosnick JA. 1995. Attitude strength: Antecedents and consequences. Mahwah.NJ: Lawrence Erlbaum.

Puffer S, Rashidian A. Practice nurses' intentions to use clinical guidelines. Journal of Advanced Nursing. 2004; 47:500–509.

Richard L, Dedobbeleer N, Champagne F, Potvin L. Predicting child restraint device use: a comparison of two models. Journal of Applied Social Psychology. 1994; 24:1837-1847.

Sable MR**,** Schwartz LR**,** Kelly PJ**,** Lisbon E**,** Hall MA. Using the theory of reasoned action to explain physician intention to prescribe emergency contraception. Perspect Sex Reprod Health. 2006; 38(1): 20-7.

Sideridis GD. An examination of the biasing properties of Cronbach coefficient alpha under conditions of varying data distribution shape: A Monte Carlo simulation. Psychological Reports. 1999; 89: 889-902.

Shepperd BH, Hartwick J, Warshaw PR. The theory of reasoned action: a meta-analysis of past research with recommendations for modifications and future research. J Consum Res. 1988; 15:325–43.

Tabachnick B, Fidell L. Using Multivariate Statistics, 4th edition. HarperCollins College Publishers, New York. 2001.

Taylor VM, Montano DE, Koepsell T. Use of screening mammography by general internists. Cancer Detection and Prevention. 1994; 18: 455–462.

Velicer WF, Jackson DN. Component analysis versus common factor analysis—Some further observations. Multivariate Behavioral Research. 1990; 25(1), 97–114.

Walker AE, Grimshaw JM, Armstrong EM. Salient beliefs and intentions to prescribe antibiotics for patients with a sore throat. British Journal of Health Psychology. 2001; 6:347–360.

Walker A**,** Watson M**,** Grimshaw J**,** Bond C. Applying the theory of planned behaviour to pharmacists' beliefs and intentions about the treatment of vaginal candidiasis with non-prescription medicines. Fam Pract. 2004; 21(6):670-6.

Table 1. Characteristics of family planning providers in Kumasi, Ghana (N=600)

Characteristics	**N (%) / mean (std dev)**
Age (years)	32.65 (11.3)
Gender	
Female	326 (54.3)
Male	274 (45.7)
Education (years)	14.07 (2.4)
Religion	
Catholic	112 (18.7)
Anglican/Methodist/Presbyterian	155 (25.8)
Other Christian	311 (51.8)
Muslim	22 (3.7)
Ethnicity	
Akan	531 (88.5)
Other	69 (11.5)
EC theoretical knowledge score*	4.1 (1.9)
EC practical knowledge score**	5.6 (1.0)
Health sector	
Private sector	502 (83.7)
Public sector	98 (16.3)
Type of facility	
Pharmacy	455 (75.8)
Clinic/hospital/maternity home	145 (24.2)
Position	
Lower-level	413 (68.8)
Higher-level	187 (31.2)
Number of services offered	2.8 (2.1)
Number of FP clients in the last month	125 (182)
Number of weekly hours worked	54 (16.6)
Number of months of experience as a FP provider	
< 24 months	432 (72.0)
≥ 24 months	168 (28.0)
Ever received EC in-service training	
No	401 (67.6)
Yes	192 (32.4)

Note: EC=emergency contraception; FP=family planning; *EC theoretical knowledge score is constructed as the sum of correct answers to 11 questions on EC as a contraceptive method; **EC practical (provision competence) knowledge score is constructed as the sum of correct answers to 8 questions related to how providers dispense EC.

Table 2. Characteristics of Theory of Planned Behavior-based scales

Scale	Scale items	Mean (std dev)	Cronbach's alpha
Attitudes	1) Providing EC reduces the # of unintended pregnancies 2) Providing EC reduced the # of abortions 3) Providing EC does not discourage the consistent use of other contraceptive methods 4) Providing EC enhances a woman's reproductive options 5) Providing EC does not pose health risks to my patients 6) Providing EC does not cause an abortion for a woman who has conceived 7) Providing EC does not encourage unprotected sex	142.0 (28.3)	0.75
Subjective norms	1) My colleagues think that I should provide EC 2) My professional organization recommends that I provide EC 3) The Ministry of Health recommends that I provide EC 4) Current medical standards recommends that I provide EC	93.3 (32.5)	0.82
Perceived behavioral control	1) Know enough about EC to be able to provide it 2) Do not need more training to be able to provide it 3) EC pill shortages do not prevent me from providing EC 4) EC pills' cost do not prevent me from providing EC 5) EC demand by patients does not prevent me from providing EC	107.3 (37.8)	0.71
Intention to provide EC	1) I intend to provide EC to women who specifically ask for this method 2) I intend to provide EC to women who had unprotected sexual intercourse 3) I intend to provide EC to adolescents who are sexually active 4) I intend to provide EC to women who experience incest or rape 5) I intend to provide EC to women who experience a problem with their contraceptive method	28.7 (5.2)	0.70

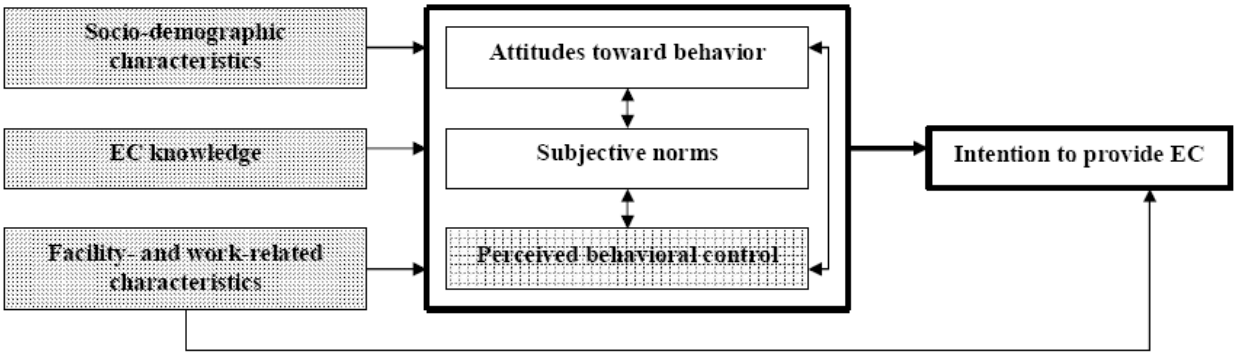
Note: EC=emergency contraception

Table 3. Summary of fit statistics for the model-based structural models

Model	χ^2	χ^2 p-value	CFI	TLI	RMSEA	SRMSR	R^2
TRA	39.67	0.00	0.99	0.99	0.02	0.01	0.17
TPB	61.29	0.00	0.99	0.99	0.02	0.01	0.29
ETPB	452.91	0.00	0.96	0.95	0.04	0.01	0.36

Note: TRA= Theory of Reasoned Action; TPB= Theory of Planned Behavior; ETPB=Extended Theory of Planned Behavior; $\chi 2$= chi-squared test; RMSEA=root mean square error; SRMSR=standardized root mean square residual; CFI= comparative fit index; TLI= Tucker-Lewis index; R^2=variance explained by the model.

Figure 1. Conceptual framework for the study of Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB) and Extended Theory of Planned Behavior (ETPB) to explain family planning providers' intention to offer emergency contraception

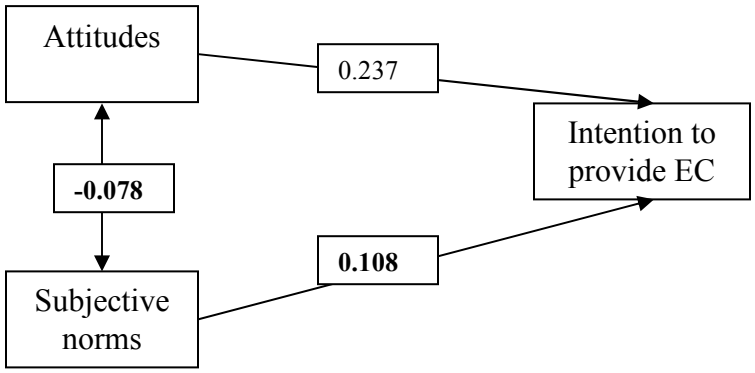


TRA component

Extension TRA → TPB

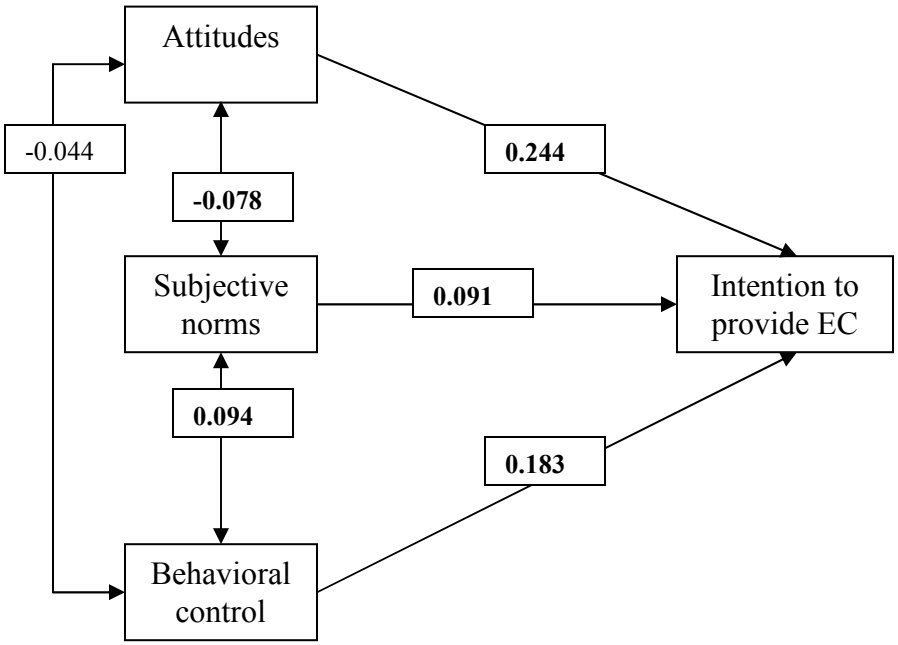
Extension TPB → ETPB

Figure 2a. Standardized path coefficients estimated based on the Theory of Reasoned Action model



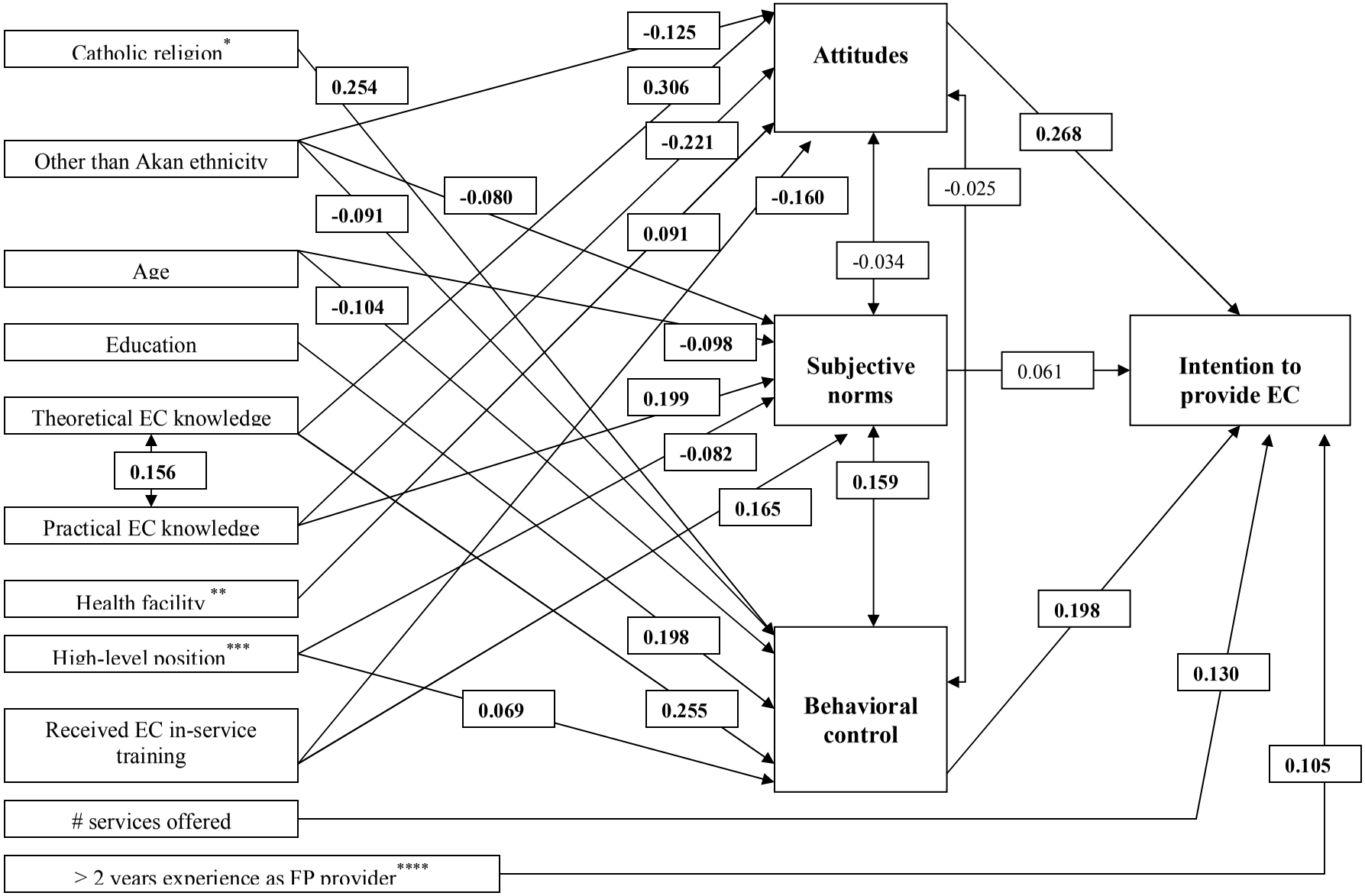
Note: Figures in bold are statistically significant at a level $p<0.05$. Standardized coefficients are presented to facilitate comparison between predictors.

Figure 2b. Standardized path coefficients estimated based on the Theory of Planned Behavior model



Note: Figures in bold are statistically significant at a level $p<0.05$. Standardized coefficients are presented to facilitate comparison between predictors.

Figure 3. Standardized path coefficients estimated based on the Extended Theory of Planned Behavior model



Note: Figures in bold are statistically significant at a level $p<0.05$; only statistically significant coefficients for the paths involving distal variables are presented; standardized coefficients are presented to facilitate comparison between predictors; FP=family planning; * ref=other Christians; ** ref= pharmacy; *** ref=lower-level position; **** ref=less than 2 years experience as FP provider. The model is adjusted for provider's age, gender, education, religion, ethnicity , EC theoretical and practical knowledge scores, health sector, type of facility, provider's position, # services offered, # FP clients in the preceding month (logged), # of weekly hours worked, # of months of experience as FP provider, having ever received EC

Title:

Predicting women's intention to use emergency contraception in urban Ghana: an application of the Theory of Planned Behavior

Authors:

Andreea A. Creanga (MD)[1], Hilary M. Schwandt (MHS)[1], Saifuddin Ahmed (MBBS, PhD)[1], Kwabena A. Danso (BSc, MB ChB, FWACS, FGCS)[2,3], Amy O. Tsui (PhD)[1]

Affiliations:

[1]Population, Family, and Reproductive Health Department
Johns Hopkins Bloomberg School of Public Health
Baltimore, USA
[2] Department of Obstetrics and Gynecology
Komfo Anokye Teaching Hospital
Kumasi, Ghana
[3] School of Medical Sciences
Kwame Nkrumah University of Science and Technology
Kumasi, Ghana

Corresponding author:

Andreea A. Creanga
Population, Family, and Reproductive Health Department
Johns Hopkins Bloomberg School of Public Health
615 N. Wolfe Street, Room W4513
Baltimore, Maryland 21205-2179
email: acreanga@jhsph.edu
Tel: 443-275-3439
Fax: 410- 955-0792

Key words: theory of planned behavior, emergency contraception, family planning clients, Ghana

Introduction

Biomedical aspects surrounding emergency contraception (EC) have been investigated and documented for more than three decades, but a large number of social and behavioral questions remain to be answered. Specifically, the mechanisms by which women make decisions about EC-related practices are still poorly understood and need to be studied in order to help formulate or refine programs and enhance their likelihood of success.

EC dedicated products are available in Ghana since 1996 (Steiner et al, 2000). To date, no mass promotion of EC has been undertaken and no public discussion has been generated around EC in this country. The 2003 Ghana Demographic and Health Survey shows that EC is the least known contraceptive method -- only 28-29% of all Ghanaian men and women report having heard about it, while only 1.1% of all women have used it (Ghana Statistical Services and ORC Macro, 2003). This method's potential to decrease the number of unintended pregnancies in a country where only a few women use reliable methods of contraception and many rely on abortion to regulate their fertility prompted an examination of women's intention to practice EC.

Behavioral intention has been characterized as the most significant predictor of individual behavior and reflects the degree of motivation to engage in specific actions. Individuals with stronger intentions to engage in a behavior are more likely to engage in a behavior than are individuals with weaker intentions (McCaul et al., 1988; Brubaker and Wickersham, 1990; Lauver et al., 1999; Martin et al., 1999; Furnham and Lovett, 2001). Based on the TRA, developed by Fishbein and Ajzen (Ajzen and Fishbein, 1980;

Fishbein and Ajzen, 1975). Intention is, in turn, determined by attitudes (the combination of beliefs and values) and subjective norms (perceived social pressure to perform the behavior). Since behaviors that are not fully volitional are also influenced by the individual's perception of his or her ability to perform the behavior, Ajzen (1985) extended the TRA by adding the perceived behavioral control as an additional predictor of behavioral intentions and proposed a new theory named the Theory of Planned Behavior (TPB) (Ajzen, 1985). Comparisons of the TRA and the TPB have shown that the addition of perceived control in the TPB model improves its predictability for behaviors that are volitional or affected by external controls, such as EC use (Netemeyer et al, 1991; Madden and Ajzen, 1992; Richard and Dedobbeleer, 1994; Sheeran and Taylor, 1999; Armitage and Conner, 2001).

Both theoretical frameworks (TRA and TPB) have been used in numerous studies in an attempt to explain human behavior. As such, these theories have been applied to behaviors including diet (Arvola et al., 1999; Conner et al., 2003), physical activity (Nguyen et al., 1997; Blue et al.**,** 2001; Carroll and Whyte, 2003), smoking (Hu and Lanese, 1998**;** Hanson, 1999**;** O'Callaghan et al.1999**;** Bursey and Craig, 2000**;** Harakeh et al., 2004**;** Maassen et al., 2004), hormone replacement therapy (Lauver et al., 1999), cancer control and prevention (Abroms et al., 2003; Kleier, 2004; Doukas et al., 2004; Ham, 2005) and condom use (Richard et al., 1998; Sheeran and Taylor, 1999; Albarracin et al., 2001; Armitage and Conner, 2001; Fekadu and Kraft, 2001).

This study examines how the Theory of Reasoned Action (TRA), its extension, the Theory of Planned Behavior (TPB), and an extended TPB (ETPB) model comparatively explain Ghanaian women's intention to use EC. Specifically, this study aims to: (1) assess the influence of women's experiential (sexual- and fertility-control) characteristics on their intention to use EC, and (2) assess the validity and utility of applying the TRA, TPB, and ETPB models to explaining Ghanaian women's intention to use EC.

Methods

Analytical model

The TPB is one of the most thoroughly tested and robust of the psychological models. Intentions, attitudes (AB), subjective norms (SN), and perceived behavioral control (PBC) have been identified by health behavior theorists as four of the eight variables believed to account for most of the variance in any given behavior; the other variables being environmental constraints, ability, self-standards, and emotion (Fishbein et al., 1992).

In this study, women's intention to use EC is assessed as a function of their attitudes toward EC, their perceived subjective norms and behavioral control. Additionally, consistent with Ajzen's (1991) assertion that "the theory of planned behavior is, in principle, open to the inclusion of additional predictors if it can be shown that they capture a significant proportion of the variance in intention or behavior after the theory's current variables have been taken into account", and with work of several other authors (Conner and Norman, 1994; Conner and Armitage, 1998; Puffer and Rashidian, 2004),

our conceptual model takes into account the existence of variables other than AB, SN and PBC that influence women's intention to use EC both directly and indirectly. Specifically, we hypothesize that certain experiential, sexual and fertility control-related variables do not only influence the way women form their attitudes toward EC practice, comply to subjective norms and perceive their control over the use of EC, but also directly explain an additional part of the variance in their self-reported intention to practice EC. Additionally, we consider that although information in the form of behavior-relevant beliefs is a central component of the TPB as originally proposed, whether the correct information and knowledge works for or against performance of the behavior is also important; therefore, we add knowledge as one of the distal predictors of women's EC use intention and theorize that it has only indirect effects on behavioral intention mediated by the other three TPB components: AT, SN, PBC. Finally, similar to EC knowledge, socio-demographic variables are considered to be distal, indirect determinants of Ghanaian women's intention to rely on EC at some point in the future. Therefore, the model we propose is an extension of the TPB model (ETPB). Relationships between variables/constructs for testing the TRA, TPB and ETPB are depicted in Figure 1.

Data

This analysis uses data collected between March and July 2008 during client exit interviews with a capture sample of 992 women attending the family planning (FP) clinic at Komfo-Anokye Teaching Hospital in Kumasi, the second largest city in Ghana. After having received FP methods and services and before leaving the clinic, women were

screened using the following question: “Have you heard about emergency contraception?” Women responding positively to this question were invited to participate in the study, and 91.3% of them consented to be interviewed.

The survey questionnaire was administered by trained college-graduate interviewers who worked in shifts to ensure that interviews took place continuously during the clinic working hours. The interviews were conducted either in English or Twi, the local dialect spoken in Kumasi, based on clients’ preference. Data were collected on clients’ socio-demographic characteristics, sexual- and fertility-control related variables, including EC knowledge and practice, as well as on scale items to measure the TPB components (AT, SN, PBC, intention). There were 2.5% of values missing on one or more of the scale items and we used an item mean substitution technique to replace missing values in all cases (Little and Rubin, 1987; Cohen et al., 2003). This approach reduces the variation in responses and replaces purely neutral views of non-respondents with potentially non-neutral opinions. However, the approach has theoretical validity under our assumption that data were missing at random.

Additionally, we used a contraceptive calendar to retrospectively collect data on women’s monthly practice of contraception, pregnancies and their outcomes, reasons to discontinue contraceptive use and marital status over a 36-month period between January 2005 and December 2007. The calendar data is used to construct the duration of contraceptive use over the past 3 years while exposed to pregnancy risk. The calendar consists of four columns of boxes, with each box representing a specific calendar month.

In the first column, the pregnancy outcome is indicated by placing the corresponding code in the appropriate months; in the second column, episodes of use of a contraceptive method are indicated by recording the method code in the boxes that correspond to the months of use. In the third column, the reason for contraceptive discontinuation is noted in the box that corresponds to the last month of specific-method use. Column four indicates the woman's marital status (married, not married) for each month.

The study was approved by the Committees of Human Research at Johns Hopkins Bloomberg School of Public Health, Baltimore, US and at Komfo-Anokye Teaching Hospital, Kumasi, Ghana.

Measures

Instruments based on the TRA or TPB have been developed to measure behavioral intentions and actual behaviors. Sable et al. (2006) had developed such an instrument trying to assess whether the TRA can be used to explain provision of EC by a convenience sample of faculty physicians in US. To our knowledge, there are no other published instruments to measure behavioral, normative or control beliefs about either provision or use of EC in developed or developing countries. Given that we have conducted a parallel study examining the utility of TPB to explaining providers' intentions to offer EC, we decided to use similar scale items for both client and provider study components and used the Sable et al. study questionnaire as a matrix. We added several items pertaining to the somewhat distinct FP use-related aspects in developing countries. Additionally, we developed theoretically derived measures of perceived

behavioral control following the TPB-based questionnaire development protocols proposed by Ajzen (2004; Sable et al. used the same protocols to develop the TRA-based questionnaire modules for their study). All elements of the questionnaire which might influence women's control over using EC were either identified from the literature, represented opinions of the clinical members of the research team or were obtained through feedback during the scale item elicitation process conducted with FP nurses working at Komfo-Anokye Teaching Hospital. Two corresponding scale items were developed for each attitude, norms and control beliefs – one measured the strength of the belief and the other measured evaluation of the belief (Ajzen, 2002). All TPB components (attitudes, social norms, perceived behavioral control and behavioral intentions) were measured on a 7-point Likert scale as recommended by many authors (Logue et al., 1988; Netemeyer et al., 2003; Ajzen, 2004).

Direct and indirect measures were available for all elements of the TPB. The direct measures for attitudes, social norms, perceived behavioral control and behavioral intention were based on one, two or three items that asked respondents to rate their attitudes, subjective norms, perceived control over behavior and their intention to use EC. Responses ranged from 1="extremely bad, negative or harmful to use EC" to 7="extremely good, positive or beneficial to use EC" for attitudes, from 1="definitely should not use EC" to 7="definitely should use EC" for norms, and from 1="strongly agree" to 7="strongly disagree" for perceived control and behavioral intentions.

The indirect measures were scales with six items for attitudes, five items for norms, six items for behavioral control and five items for intention to use EC.

Client attitude scale: The six items included in the scale were related to the possible outcomes of using EC: 1) prevent an unintended pregnancy, 2) prevent an abortion, 3) not discourage consistent use of other contraceptives, 4) not encourage unprotected sex, 5) not pose health risks to women, and 6) use is not inconvenient. Participants were asked how likely each of these beliefs was to be true for them, and answers ranged from 1="extremely unlikely" to 7="extremely likely". In addition, participants were asked how good or bad each of these outcomes was and answers range from 1="extremely bad" to 7="extremely good". An individual score on this scale was computed by first multiplying each item assessing beliefs about the outcomes by the evaluation of the outcomes; product scores were then summed across all items for a total score for each respondent. The total scale score ranged from 6 to 294

Client subjective norms scale: Four scale items assessed women's beliefs about whether specific professional referents think they should use EC; responses ranged form 1="definitely should not" to 7="definitely should". The four specific referents were the partner, the priest, friends and other community members. Women were also asked how much they want to comply with each referent (1="not at all" to 7="very much"). For the final score we weighted individuals' beliefs about the specific professional referents by their motivation to comply with those referents. The total scale score ranged from 4 to 196.

Client perceived behavioral control scale: The six items in this scale represented women's beliefs over the frequency (1="very frequently" to 7="never") with which they

encounter six barriers to EC use: 1) self-assessed knowledge, 2) embarrassment to ask medical professionals for the pills, 3) EC shortages, 4) EC cost, 5) not being recommended by a medical professional to take EC, and 6) not being given EC at home to use in case of need. We also measured how easy women considered it was to use EC in the context of the identified barriers (1="much easier" to 7="much more difficult"). The total score for this scale ranged from 6 to 294.

Client intention to use EC scale: The five items in this scale informed on the extent to which women intend to use EC in each of the following five scenarios: 1) have unprotected sexual intercourse, 2) experience a problem with their contraceptive method, 3) experience incest or rape, 4) have the drugs at home, 5) their partner asks them to use it. Responses were given on a seven-point Likert scale (1="not at all" to 7="very much"), and scores for this scale ranged from 5 to 245.

The socio-demographic characteristics used in the analyses are: client's residence (urban/rural); age categorized as 18-24, 25-29, 30-34, ≥ 35 years; education and number of living children measured continuously; marital status (married or in union versus unmarried or not in union); religion categorized as Catholic, Anglican/Methodist/ Presbyterian,, other Christian and Muslim; ethnicity categorized as Akan or other; and quintiles of the household wealth index created using principal components analysis and the information on household assets. The sexual- and fertility-control related variables were: sexual activity in the 30 days prior to the interview categorized as at least twice per week, 1-7 times per month and never; whether or not the woman ever had an abortion measured as a binary (yes/no) variable; the proportion of months during the three-year

calendar period when the woman used contraception while exposed to the risk of becoming pregnant (she was not pregnant or during the postpartum insusceptibility period assumed constant over time and set at the median level as per the 2003 Ghana Demographic and Health Survey for the Ashanti region); whether the woman has ever experienced contraceptive side-effects; and the method intended for use in the next 12 months categorized as no method/traditional/modern short-term and modern long-term -- this broad categorization distinguishes between women who might have a reason to use EC (those who do not intend to practice contraception or plan to use a method compatible with back-up EC use) and women who intend to use highly reliable, non-intercourse dependent methods and thus, have no obvious reason to believe at the time of the interview that their method could fail.

Analyses

Scale development for Theory of Planned Behavior components

Before any calculations, we recoded the items in all scales to have negatively worded endpoints on the left, so that the higher numbers always reflect positive attitudes, norms, control and intention toward the target behavior. We computed correlations between direct and indirect measures of the TPB model components to ensure content validity, and between each of the three mediating-components of the TPB (attitudes, social norms and perceived behavioral control) and intention to use EC. Additionally, within each scale, items were dropped when inter-item correlations were either below 0.25 or greater than 0.70 (Kerlinger, 1986). We then conducted a series of exploratory factor analyses (EFA) in order to identify the underlying dimensions in the scale and reduce the number

of items in each so that the remaining items maximize the variance explained and scale's reliability (Netemeyer et al., 2003). The structure of the scales was tested using principal component analysis (PCA) as the extraction method to reduce the number of variables into more parsimonious and manageable factors (Tabachnick and Fidell, 2001). We retained one factor for all scales, a decision based on the Kaiser criteria (eigenvalues > 1) and the scree test/plots (Velicer and Jackson, 1990), and thus confirmed the unidimensionality of all scales. An item was considered to belong to a given component if its loading (correlation between the variables and the underlying factor) was higher than 0.40 (Tabachnick and Fidell, 2001), and less than 0.90 (Netemeyer et al, 2003). Cronbach alpha was computed to verify the internal consistency of the TPB constructs as it has been found to be a robust statistic (Sideridis, 1999), and factor loadings for the factor solution were recorded.

.

Similar EFA steps were followed to confirm the unidimensionality of the EC knowledge score. After obtaining predicted values from factor analysis, the knowledge variable was standardized. We also constructed an EC knowledge score as the sum of correct answers to the seven EC knowledge-related questions identified with EFA. Given that we obtained similar results with both types of knowledge measures, we decided to show the results using the more easily interpretable measure, the summed score.

Analyses in this phase were carried out using Stata version 9.1 (Stata Corporation, College Station, TX).

Structural equation modeling

The proposed relationships between constructs as delineated by the TRA, TPB and ETPB conceptual models (Figure 1) were examined through structural equation modeling (SEM), with Mplus software, version 5 (Muthén and Muthén, 2001). SEM is chosen because this approach is superior to OLS techniques in its capacity to assess the adequacy of theorized models and in comparing these models. The key feature of this approach is the assumption of the existence of latent variables, not observed directly but instead expressing themselves through responses to survey items. Any one of these items may be imperfectly measured, but collectively they are assumed to provide an adequate representation of the unobserved variable (Byrne, 2006). This technique consists of two interrelated components: a measurement model and a structural model. The measurement model specifies how the latent constructs are indicated by their observed indicators, and the structural equation model specifies causal relationships among observed and latent variables and describes their direct and indirect effects.

Mplus allows the use of both continuous and categorical variables as independent and dependent variables. In our models, we had a mixture of continuous and binary variables. Mplus analyzes the correlation matrix of all variables, and parameters in the models were estimated according to the weighted least square method (WLS estimator) (Muthén and Muthén, 2001). Correlations among variables were measured by polychoric correlation (when both variables were categorical) and polyserial correlation (when one of the variables was categorical and the other was continuous) instead of Pearson's product-moment correlation. With binary variables in the model, the estimation by WLS method

produces asymptotically correct estimates with large samples. The WLS method is considered to generate the "asymptotically distribution free best estimators" (Browne, 1984). In this method, the inverse of the asymptotic covariance matrix of polyserial estimates is supplied as the weight for least square estimates (Browne, 1984; Ahmed and Mosley, 2002). The asymptotically distribution-free estimates are considered to be robust to violations in the assumption of normality (Browne, 1984; Ahmed and Mosley, 2002).

Five measures of overall goodness of fit were used to determine how well the models fit the data: chi-square ($\chi 2$), root mean square error of approximation (RMSEA), standardized root mean square residual (SRMSR), the comparative fit index (CFI) and the Tucker-Lewis index (TLI). The $\chi 2$ test assesses whether there is a statistically significant difference between the covariance matrix implied by the hypothesized model and the covariance matrix of the observed variables in the population; a non-significant $\chi 2$ indicates a good fit (Bollen and Long, 1993). However, because the chi-square is heavily influenced by sample size (Bollen and Long, 1993), several fit indices have been proposed as aids to model fitting (Bentler, 1990, 1998; Joreskog and Sorbom, 1981, 1993). A value of RMSEA <0.05 indicates very good fit, and values up to 0.08 indicate reasonable errors of approximation in the population. SRMSR has been shown to be sensitive to model misspecification and its use recommended by Hu and Bentler (1999); values less than 0.08 are considered to be indicative of acceptable model fit. The fit index that has been suggested as most appropriate is the CFI; it has a small sampling variability and appears to be unaffected by sample size (Bentler, 1990; Garrett et al., 1994). For

validity purposes, CFI and TLI with values over 0.95 are considered acceptable for a good model fit (Bentler, 1990; Hays et al., 1994).

Path coefficients depicted in the models are analogous to standardized regression coefficients. The standardized path coefficients serve as estimates of the relative importance (weights) of the predictors. Based on the statistical significance of the coefficients of structural parameters we were able to identify key predictors of women's intention to use EC. We also identified the effects of socio-demographic, EC knowledge and experiential variables on intention to practice EC and report how much of the variance in intention is accounted for by the modeled predictor variables comparatively between TRA, TPB and ETPB models.

Results

Overall, our sample represents 34.6% of all female clients attending the clinic during the study period (repeat clients during the study period are counted only once) -- some 52% (1,490) of clients were screened, 1,086 (72.9%) reported having heard about EC and 992 (91.3%) consented to participate in the survey. The reasons women gave for refusing study participation were lack of time and/or interest in the survey topic. Table 1 provides a comparison between characteristics of women interviewed (N=992) and of all clients (N=2,866) attending the FP clinic at Komfo-Anokye Teaching Hospital during the study period. It appears that we have captured slightly more condom and implant users and fewer users of injectable contraception than recorded in the clinic log books over the study period ($p<0.05$).

Table 2 shows the characteristics of the sample of FP clients knowledgeable about EC. Most women in our sample reside in urban areas (85.7%) and are either married or in union (94.8%). Their mean age was 31 years and have, on average, 3 children; the Akans are the dominant ethnic group (83.4%). More than one third of the respondents report ever having had an abortion, some 41% of them have not used contraception while exposed to pregnancy in the last three years and approximately the same percentage have been protected by contraception over at least two fifths of the last three years when at risk of becoming pregnant. A quite large proportion (43.3%) of the women in our sample report experiencing side effects while using a contraceptive method. In terms of knowledge, women have correctly responded to an average 1.7 of the 7 EC questions asked (standard deviation=1.3). Interestingly, about 75.0% of the women interviewed report intending to use modern, long-acting methods of contraception in the following twelve months.

Table 3 lists the items in the TPB-based scales, the mean and standard deviations of the scale scores and the estimates of internal consistency reliability (Cronbach alpha), all of which are greater than 0.7. All scales were scored so that high scores reflected a positive disposition toward intention to use EC.

Table 4 shows the summary of fit statistics comparing the TRA, TPB and ETPB structural equation models. While the chi-squared tests are statistically significant and thus, indicative of poor fit for all models, this situation is likely due to the relatively large sample size as proven by Bollen and Long (1994). Overall, the other fit indices show that

all models, TRA, TPB and ETPB, provide a good fit to the data. The CFI, TLI and RMSEA indices for the ETPB model are slightly lower than for the TRA and TPB models, but they still indicate adequate model fit. On the other hand, the ETPB model explains more of the variance in women's intention to use EC (34.0%) than either the TPB (26.3%) or the TRA (18.4%) models.

Figures 2a and 2b depict the structural TRA- and TPB-based models with standardized coefficients shown for each path. Applying the most simple, TRA-based model to explain intention to use EC by FP clients in Kumasi is not supported by the data -- the estimated structural model identifies a negative and significant correlation between subjective norms and intention to use EC, but no relationship between attitudes toward and intention to use this method. With the introduction of the PBC construct, the three TPB components (AT, SN, PBC) are significantly related to women's intention to use EC. This TPB-based model identifies behavioral control over using EC as the strongest predictor of women's intention to use this method, while more favorable attitudes and perceived social norms related to EC use do not appear to increase women's intention to use EC. However, overall, as shown in Table 4, addition of the PBC construct and extension of the TRA to TPB increases the predictive power of the structural model to explain Ghanaian women's intention to use EC.

Figure 3 shows the structural ETPB-based model, the standardized coefficients for *all* paths between the TPB elements (attitudes, social norms, perceived behavioral control and behavioral intentions) and the *statistically significant* standardized coefficients for

the paths involving the TPB model extensions. Based on this model, attitudes and behavioral control significantly influence women's intention to use EC. However, more favorable attitudes toward EC do not lead to a greater intention of women to use EC, but their greater confidence on the ability to use the method does. On the other hand, given the added extensions from TPB to ETPB, women's perceptions of the social pressure to using EC no longer predict women's intention to do so. Ajzen proposed that attitudes, social norms and perceived behavioral control constructs are all correlated with each other. In our ETPB model only attitudes and behavioral control constructs are significantly and negatively correlated, while their individual relationship with social norms related to EC practice is confounded by the proposed model extensions. The ETPB model explains more of the variance in EC use intention than either the TPB or the TRA, and given that all models provide an adequate fit to the data, the ETPB represents our model of choice.

The ETPB structural model identifies two direct experiential determinants of intention to use EC by FP clients attending the clinic at Komfo-Anokye Teaching Hospital in Kumasi. It appears that having used a contraceptive method more than 40% of time when recently exposed to pregnancy is almost as strong a predictor of higher intention to use EC as women's perceived ability to use this method (standardized path coefficients: 0.272 and 0.275, respectively). Conversely, a lower coital frequency in the month preceding the interview seems to directly and, not surprisingly, negatively influence women's intention to use EC.

Other distal factors are shown to indirectly influence women's intention to practice EC, their effects being mediated by attitudes, subjective norms and/or behavioral control. Among the socio-demographic variables included in the structural model, being Catholic as opposed to *other Christian* negatively predicts women's attitudes and perceived norms related to EC; non-Akan ethnicity is negatively related to two of the proposed mediators: norms and behavioral control over using EC. Additionally, women in the highest rather than lowest wealth quintile seem to have more favorable attitudes toward EC and more confidence in their ability to use it. Also, not surprisingly, we find that having experienced an abortion is an important determinant of women's positive attitudes toward EC and their perceived ability to use this method.

Discussion

TRA and TPB have received considerable attention in the literature. Within the health arena, their applications have almost exclusively focused on predicting behavioral intentions and behaviors of patients. However, no previous study has applied a psychosocial theory to elicit an understanding of women's intention to use EC in a developing country. We compare the efficacy of the TRA, TPB and ETPB to explain intention to practice this particular behavior by Ghanaian women who are FP clients. The adequacy of each model was judged on the basis of model fit and explanatory power.

All models adequately fit the data; the slightly lower fit indices for the ETPB model are likely due to the considerable higher number of parameters estimated in this model relative to the other two models. The TPB model is supported by the data since the three

theoretical constructs (AT, SN, PBC) are all significant predictors of women's intention to use EC. Based on this model, the stronger the perceived control over EC use the more likely women are to intend to use this method. On the other hand, it seems that more favorable attitudes and perceived social norms do not lead to women's higher intentions to use EC. These latter findings are unexpected and difficult to explain in the absence of an extended model to include distal factors influencing women's attitudes toward EC and their perception of salient referents' position vis-à-vis its use.

The ETPB model is only partially consistent with the underlying assumptions of the TPB and suggests that attitudes and perceived behavioral control are significant determinants of Ghanaian women's intention to use EC, while the perceived social norms related to this practice are not. That is, intentionally or unintentionally, Ghanaian women act the way they think most of the time. Attitudes are formed having in mind the consequences of a behavior and, in this case, seem to be negatively linked to the formation of one's intention to use EC. In sum, it appears that personal forces are stronger than social forces when it comes to self-reported intentions to use a contraceptive method such as EC.

These findings only to a certain extent match results of two meta-analyses of TPB applications predicting intentions to use condoms (Sheeran and Taylor, 1999; Albarracian et al., 2001). Both analyses identified attitudes, norms and behavioral control as predictors of intention to use condoms and attitudes as the strongest predictor. A comparison between TPB applications of condom and EC use is warranted by the similarities between the two behaviors; however, differences in study results likely stem

from the obvious differences between the two behaviors: (1) condoms offer dual protection (against pregnancy and STIs/HIV) and thus, potential users may comparatively have more favorable attitudes toward condoms than toward EC use, (2) condom use needs to be discussed and/or negotiated with partners, thus perceived social norms related to their use may be stronger than those related to EC use, and (3) both men and women can use condoms during either hetero- or homo-sexual intercourse, and thus the study populations in the above mentioned meta-analyses and that of our study are quite different.

Interestingly, we find that having used a contraceptive method in more than 40% of the time when exposed to pregnancy in the three years preceding the interview is a key predictor of all TPB constructs (AT, SN, PBC, intention to use EC). It positively predicts both women's perceived confidence in being able to use EC and their higher intention to do so. Conversely, this factor negatively influences women's attitudes toward and perceived social norms related to EC use. Such findings are consistent with the notion that people base their intentions on past behaviors (Albarracin et al., 2001). Clearly, women who have experience using other methods of contraception perceive themselves able to use EC as well; however, relative to the method they are used to practicing, they might consider EC as inferior in its ability to provide adequate protection against an unintended pregnancy. The frequency with which a behavior has been performed in the past is found to account for variance in intention to later perform a similar behavior independent of other factors. It is worth noting here that our sample is comprised of FP clients, thus, of women who are more likely to have experience with use of other

contraceptive methods. While initially this seemed to be a weakness of our study design, it has proven to be a strength as we might not have had enough power to identify this predictor in the country's general population with a low contraceptive prevalence rate.

Several studies have indicated that people's past behavior in a domain is a reliable predictor of their future intentions, even after the effects of attitudes, subjective norms and behavioral control have been controlled (Bentler & Speckart, 1979; Bagozzi and Kimmel, 1995; Norman and Smith, 1995; Conner et al., 1999). To use the same example of condom use, Albarracian et al. (2001) found that past use of condoms exerted strong direct influences on attitudes, norms, and intentions to use condoms and confounded the relationships between both subjective norms and perceived behavioral control and intentions. Similarly, both studies (Rise, 1992; Reinecke et al, 1996) in the meta-analysis by Sheeran and Taylor (1999) that included past condom use as a predictor of future use intention found its addition to exert a substantial influence and one not mediated by the effects of attitudes, subjective norms or perceived behavioral control. In all these cases, however, past behavior referred to the same behavior under study.

We fail to identify women's EC specific knowledge as an important predictor of related attitudes, perceived norms and control over using EC, and this might as well be a function of our sample's composition – there is obviously less variability in EC knowledge among women in our sample than in the general population of Ghanaian women, with FP clients being, on average, more knowledgeable about this method than their counterparts.

Additionally, we show that other distal factors indirectly influence women's intention to use EC (their effects being mediated by AT, SN and PBC). Among these, the household wealth is a significant predictor of favorable attitudes toward EC and higher perceived control over using EC. Such findings can be easily explained by the relatively high cost of specifically packaged EC products: one EC regimen costs about eight times more than regular contraceptive pills for a month. Previous research on extended TRA or TPB models indicated that the relationships between background, socio-demographic variables and behaviors such as condom use is weak (Sheeran et al., 1999).

We find that our application of the TPB and ETPB models explains 26% and 34%, respectively, of FP clients' intention to use EC. The scale of explanation is found by several meta-analyses which summarized results from the various, not exclusively health-related, TPB applications. A recent meta-analysis (Armitage and Conner, 2001) of 185 studies up to the end of 1997 showed that TPB accounted for 39% of the variance in behavioral intentions. This analysis was an update of another systematic review of TPB applications restricted to the domain of health conducted by Godin and Kok in 1996. Their results indicated that the theory performs very well for the explanation of health-related behavioral intentions (averaged R^2=0.41). In both reviews, attitudes toward the action and perceived behavioral control were most often the significant variables responsible for the explained variation in behavioral intention, while the subjective norm construct was generally found to be a weak predictor of intentions. Armitage and Connor (2001) consider this latter finding attributable to a combination of poor measurement and

the need for expansion of the normative component. Authors of both reviews concluded that the efficiency of the TPB varies greatly across behaviors.

This study is not without limitations. Behavioral intention is an intermediate outcome that is hypothesized to predict an ultimate outcome: behavior. Due to its cross-sectional rather than longitudinal design our study can only explore women's intention to use EC, but not the actual behavior. Thus, the efficacy of the full TRA, TPB and, by implication, ETPB models is not tested, and conclusions about intention do not imply conclusions about actual behavior. Also, behavioral self-reports are contaminated by self-reports of cognitions, and often, by the tendency for some respondents to overstate performance of socially desirable behaviors. Biases of this kind can inflate observed correlations between cognitions and behavioral intentions. The contraceptive calendar data has limitations associated with retrospective reports of contraceptive practice and pregnancy history. However, Moreno and Goldman analyzed the quality of DHS calendar data and noted that, in general, the information collected does not suffer from selection bias or attrition problems, and that this kind of measurement allows for in-depth analyses of users of contraception (Goldman et al. 1983; Moreno and Goldman 1991; Moreno 1993).

Importantly, structural equation models do not test directionality in relationships, and the directions of arrows in the ETPB represent our hypotheses of causality within the behavioral intention process we studied. This methodology can evaluate whether a causal hypothesis and the empirical data are consistent; if not, the causal hypothesis can be rejected statistically; if yes, the causal hypothesis cannot be rejected though it cannot be

"proven" by the methodology (Bentler and Stein, 1992). The model is susceptible to erroneous parameter estimates and model fitting if we have misspecified the true measurement and structural relationships. In addition, our sample is comprised of FP clients in urban Ghana and therefore, this study's results may not be generalizable to all women in Ghana.

Sheppard et al.(1988) found three limiting conditions on the use of attitudes and subjective norms to predict intentions and performance of behavior: (1) the distinction between a goal intention (e.g. preventing a pregnancy by using EC) and a behavioral intention (e.g. intending to use EC); (2) the choice among alternatives given that the presence of choice may dramatically change the nature of the intention formation process and the role of intentions in the performance of behavior; and (3) the distinction between what one intends to do and what one actually expects to do. Intentions typically account only for about 20% to 40% of the variance in social and health behaviors in prospective studies (Conner and Armitage, 1998; Conner and Sparks, 1996; Godin and Kok, 1996; Randall and Wolff, 1994; Sheeran and Orbell, 1998). Thus, it appears that merely intending to perform a behavior is not sufficient to behavioral change in many cases (Orbell and Sheeran, 1998). This may, for example, be the result of competing goals or intentions, lack of knowledge of how to fulfill the goal, or simply forgetting an intention. However, in the field of contraception research, several longitudinal analyses have shown women's stated intentions to be strongly associated with their later contraceptive behavior (Bhatia, 1982; Adler et al., 1990; Curtis and Westoff, 1996).

Therefore, prospective studies are needed in the future to assess the predictive value of applying the TPB model to actual EC practice in Ghana and/or other developing countries; such applications in other settings will be able to validate our measures and results. Moreover, as a significant amount of variability in EC use intentions remains unexplained, alternative theoretical frameworks may need to be examined and can be extremely informative in identifying other promising avenues of exploration.

Conclusions

The proposed ETPB provides a valid and useful summary of the key variables that influence EC use intention by FP clients in urban Ghana. Perceived control over using EC was the best predictor of intention, suggesting that interventions that focus on women's education and FP counseling and those that ensure EC's availability and accessibility will be helpful to support women's intention to use this method. We have shown that factors other than attitudes and behavioral control may influence behavioral intentions (e.g. past abortion and contraception practice, household wealth); based on these findings, EC education messages can be targeted to reach poor women and those who do not practice contraception and have not been using abortion services. As such, education sessions conducted in the community or in work places may be helpful in raising awareness about EC and informing women where to find and how to practice the method. Countries with high maternal health costs, such as Ghana, are likely to obtain significant benefits from making EC widely available and used – the method has the potential to substantially reduce the incidence of unintended pregnancy and the consequent need for abortion.

References

Abroms L, Jorgensen CM, Southwell BG, et al. Gender differences in young adults' beliefs about sun screen use. Health Educ Behav.2003; 30(1):29-43.

Adler NE, Kegeles SM, Irwin CE Jr, Wibbelsman C. Adolescent contraceptive behavior: an assessment of decision processes.J Pediatr. 1990; 116(3):463-71.

Ahmed S, Mosley WH. Simultaneity in the Use of Maternal-child Health Care and Contraceptives: Evidence From Developing Countries. Demography. 2002; 39 (1): 75-93.

Ajzen I. From intentions to actions. In: J. Kuhl and J. Beckman, Editors, Action Control from Cognition to Behavior, Springer Verlag, New York. 1985; 11–39.

Ajzen I. Theory of planned behavior. Organ Behav Hum Decis Process. 1991; 50(2):179-211.

Ajzen, I. Perceived Behavioral Control, Self-Efficacy, Locus of Control, and the Theory of Planned Behavior. Journal of Applied Social Psychology. 2002; 32: 665-683.

Ajzen I. Construction of a standard questionnaire for the theory of planned behavior. 2004. Available at: http://www.unix.oit.umass.edu/-ajzen/

Ajzen I, Fishbein M. Understanding Attitudes and Predicting Social Behavior. Upper Saddle River: Prentice-Hall. 1980:1-278.

Albarracín D, Johnson BT, Fishbein M. Theories of reasoned action and planned behavior as models of condom use: a meta-analysis, Psychol Bull. 2001; 127: 142–161.

Armitage CJ, Conner M. Efficacy of the theory of planned behaviour: a meta-analytic review. Br J Soc Psychol. 2001; 40(Pt 4):471-99.

Arvola A, Lahteenmaki L, Tuorila H. Predicting the intent to purchase unfamiliar and familiar cheeses: the effects of attitudes, expected liking and food neophobia, Appetite. 1999; 32(1): 113–126.

Bagozzi RP, Kimmel SK. A comparison of leading theories for the prediction of goal directed behaviours. British Journal of Social Psychology. 1995; 34: 437-461.

Bentler PM. Comparative fit indices in structural models. Psychol Bull. 1990; 107:238–46.

Bentler PM. EQS Structural Equations Program manual. Los Angeles, CA: BMDP Statistical Software Inc. 1998.

Bentler PM, Speckart G. Models of attitude-behavior relations. Psychological Review. 1979; 86: 452-464.

Bentler PM, Stein JA. Structural equation models in medical research. Statistical methods in medical research. 1992; 1(2):159-81.

Bhatia S. Contraceptive intentions and subsequent behavior in rural Bangladesh. Stud Fam Plann. 1982; 13(1):24-31.

Blue JW, Marston-Scott V. Exercise among blue-collar workers: application of the theory of planned behavior, Research in Nursing and Health. 2001; 24: 481–493.

Bollen KA, Long JS (Eds.). Testing structural equation models. Newbury Park, CA: Sage. 1993.

Browne MW. Asymptotic Distribution Free Methods in Analysis of Covariance Structures. British Journal of Mathematical and Statistical Psychology. 1984; 37: 62-83.

Brubaker RG, Wickersham D. Encouraging the practice of testicular self-examination: a field application of the theory of reasoned action. Health Psychol. 1990; 9(2):154-163.

Bursey M, Craig D. Attitudes, subjective norm, perceived behavioral control, and intentions related to adult smoking cessation after coronary artery bypass graft surgery. Public Health Nursing. 2000; 17 (6): 460–467.

Byrne BM. Structural equation modeling with EQS: basic concepts, applications, and programming, Lawrence Erlbaum Associates, Mahwah, NJ. 2006.

Carroll LJ, Whyte A. Predicting chronic back pain sufferers' intention to exercise. British Journal of Therapy & Rehabilitation. 2003; 10(2):53-58.

Cohen J, Cohen P, West SG, Aiken LS. Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences, 3rd edition. Mahwah, N.J.: Lawrence Erlbaum. 2003.

Conner M, Armitage C. Extending the theory of planned behavior: a review and avenues for further research. Journal of Applied Social Psychology 1998; 28: 1429–1464.

Conner M, Kirk SFL, Cade JE, Barrett JH. Environmental influences: actors influencing a woman's decision to use dietary supplements. The Journal of Nutrition 2003; 133(6): 1978S-1982S.

Conner M, Norman P. Comparing the health belief model and the theory of planned behaviour in health screening. In Rutter D and Quine L (Eds.). Social Psychology and Health: European perspectives.Aldershot, UK: Avebury. 1994.

Conner M, Norman P, Bell R. The theory of planned behavior and healthy eating. Health Psychology. 2002; 21: 194-201.

Conner M, Sparks P. The theory of planned behaviour and health behaviours. In Conner, M. and Norman, P. (eds), Predicting Health Behaviour. Open University Press, Buckingham, 1996: 121–162.

Conner M, Warren R, Close S, Sparks P. Alcohol consumption and the theory of planned behavior: An examination of the cognitive mediation of past behavior. Journal of Applied Social Psychology. 1999; 29:1676-1704.

Curtis SL, Westoff CF. Intention to use contraceptives and subsequent contraceptive behavior in Morocco. Stud Fam Plann. 1996; 27(5):239-50.

Doukas DJ, Localio AR, Li Y. Attitudes and beliefs concerning prostate cancer genetic screening. Clin Genet. 2004; 66(5):445-451.

Fekadu Z, Kraft P. Self-identity in planned behaviour perspective: Past behaviour and its moderating effects on self-identity-intention relations. Social Behaviour and Personality. 2001; 29: 671-686.

Fishbein M, Ajzen I. Belief, attitude, intention and behavior: an introduction to theory and research, Addison-Wesley, MA. 1975.

Fishbein M, Bandura A, Triandis HC, Kanfer FH, Becker MH, Middlestadt SE. Factors Influencing Behavior and Behavior Change. Bethesda, MD, National Institute of Mental Health. 1992.

Furnham A, Lovett J. Predicting the use of complementary medicine: a test of the theories of reasoned action and planned behavior. J Appl Soc Psychol. 2001; 31(12):2588-2620.

Ghana Statistical Services and ORC Macro. Final Report. Ghana Demographic and Health Survey. 2003.

Godin G, Kok G. The theory of planned behavior: a review of its applications to health-related behaviors. Am J Health Promot. 1996; 11(2):87-98.

Goldman N, Pebley NR, Westoff CF, Paul LE. Contraceptive failure rates in Latin America. InternationalFamily Planning Perspectives. 1983; 9(2): 50–57.

Ham OK. The intention of future mammography screening among Korean women. Community Health Nurs. 2005; 22(1):1-13.

Hanson MJ. Cross-cultural study of beliefs about smoking among teenaged females, Western Journal of Nursing Research. 1999; 21(5): 635–647.

Harakeh Z, Scholte RH, Vermulst AA, de Vries H, Engels RC. Parental factors and adolescents' smoking behavior: an extension of the theory of planned behavior, Preventive Medicine. 2004; 39(5): 951–961.

Hays RD, Marshall GN, Wang EY, Sherbourne CD. Four-year cross-lagged associations between physical and mental health in the medical outcomes study. Journal of Consulting and Clinical Psychology. 1994; 62, 441-449.

Hu L, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. Struct Equ Model. 1999; 6:1–55.

Hu SC, Lanese R. The applicability of the theory or planned behavior to the intention to quit smoking across workplaces in southern Taiwan, Addictive Behavior. 1998; 23(2): 225–237.

Jöreskog K, Sörbom D. LISREL V: Analysis of Linear Structural Relationships by the Method of Maximum Likelihood.Chicago: National Educational Resources. 1981.

Jöreskog KG, Sörbom D. Structural Equation Modeling with the SIMPLIS Command Language.Chicago: Scientific Software Inc. 1993.

Kerlinger FN. Foundation of behavioral research (3rd ed.). New York: Holt, Rinehart, & Winston. 1986.

Kleier JA. Nurse practitioners' behavior regarding teaching testicular self-examination. J Am Acad Nurse Pract. 2004;16(5):206-218.

Lauver DR, Settersten L, Marten S, et al. Explaining women's intentions and use of hormones with menopause. Res Nurs Health.1999; 22(4):309-320.

Little RJA, Rubin DB. Statistical analysis with missing data. New York, Wiley. 1987.

Logue AW, Logue CM, Uzzo RG, McCarty MJ, Smith ME. Food preferences in families. Appetite. 1988; 10: 169-180.

Maassen IT, Kremers SP, Mudde AN, Joof BM. Smoking initiation among Gambian adolescents: social cognitive influences and the effect of cigarette sampling, Health Education Research. 2004; 19(5):551–560.

Madden PE, Ajzen I. A comparison of the theory of planned behavior and the theory of reasoned action, Personality and Social Psychology Bulletin. 1992; 18: 3–9.

Martin SC, Jacobsen PB, Lucas DJ, Branch KA, Ferron JM. Predicting children's sunscreen use: application of the theories of reasoned action and planned behavior. Prev Med. 1999; 29(1):37-44.

McCaul KD, O'Neill HK, Glasgow RE. Predicting the performance of dental hygiene behaviors: an examination of the Fishbein and Ajzen Model and self-efficacy expectations. J Appl Soc Psychol. 1988; 18(2):114-128.

Moreno L. Differences by residence and education in contraceptive failure rates in developing countries. Int Fam Plan Perspect. 1993; 19(2): 54–60.

Moreno L, Goldman N. Contraceptive failure rates in developing countries: Evidence from the Demographic and Health Surveys. Int Fam Plan Perspect. 1991; 17(2): 44–49.

Muthén LK and Muthén BO. Mplus user's guide. (Second ed.), Muthén and Muthén, Los Angeles (CA). 2001.

Netemeyer RG, Burton S, Johnston M. Volitional and Goal-Directed Behaviors: A Confirmatory Analysis Approach. Social Psychology Quarterly. 1991; 54 (2): 87-100.

Netemeyer RG, Bearden WO, Sharma S. Scaling Procedures: Issues and applications. Sage Publications, Thousand Oaks, CA. 2003.

Nguyen MN, Potvin L, Otis J. Regular exercise in 30- to 60-year-old men: Combining the stages-of-change model and the theory of planned behavior to identify determinants for targeting heart health interventions. Journal of Community Health. 1997; 22(4): 233-246.

Norman P, Smith L. The theory of planned behaviour and exercise: An investigation into the role of prior behaviour, behavioural intentions and attitude variability. European Journal of Social Psychology. 1995; 25: 403-415.

O'Callaghan FV, Callan VJ, Baglioni A.Cigarette use by adolescents: attitude-behavior relationships, Substance Use and Misuse. 1999; 34(3): 455–468.

Orbell S, Sheeran P. Inclined abstainers: A problem for predicting health behavior. British Journal of Social Psychology. 1998; 37:151–165.

Puffer S, Rashidian A. Practice nurses' intentions to use clinical guidelines. Journal of Advanced Nursing. 2004; 47:500–509.

Randall DM, Wolff JA. The time interval in the intention–behaviour relationship: Meta-analysis. British Journal of Social Psychology 1994;33: 405–418.

Reinecke J, Schmidt P, Ajzen I. Application of the theory of planned behavior to adolescents' condom use: A panel study. Journal of Applied Socila Psychology. 1996; 26: 749-772.

Richard L, Dedobbeleer N, Champagne F, Potvin L. Predicting child restraint device use: a comparison of two models. Journal of Applied Social Psychology. 1994; 24:1837-1847.

Richard R, de Vries NK, van der Pligt J. Anticipated regret and precautionary sexual behaviour. Journal of Applied Social Psychology 1998; 28: 1411-1428.

Rise J. An empirical study of the decision to use condoms among Norwegian adolescents using the theory of reasoned action. Journal of Community and Applied Social Psychology. 1992; 2:185-197.

Sable MR, Schwartz LR, Kelly PJ, Lisbon E, Hall MA. Using the theory of reasoned action to explain physician intention to prescribe emergency contraception. Perspect Sex Reprod Health. 2006; 38(1): 20-7.

Sheeran P, Orbell S. Do intentions predict condom use? Meta-analysis and examination of six moderator variables. British Journal of Social Psychology. 1998; 37: 231–250.

Sheeran P, Taylor S. Predicting intentions to use condoms: Meta-analysis and comparison of the theories of reasoned action planned behavior. Journal of Applied Social Psychology 1999; 29:1624–1675.

Sheeran P, Abraham C, Orbell S. Psychosocial correlates of hetero-sexual condom use: A meta-analysis. Psychological Bulletin. 1999; 125: 90-132.

Shepperd BH, Hartwick J, Warshaw PR. The theory of reasoned action: a meta-analysis of past research with recommendations for modifications and future research. J Consum Res. 1988; 15:325–43.

Sideridis GD. An examination of the biasing properties of Cronbach coefficient alpha under conditions of varying data distribution shape: A Monte Carlo simulation. Psychological Reports. 1999; 89: 889-902.

Steiner MJ, Raymond E, Attafuah JD, Hays M. Provider knowledge about emergency contraception in Ghana. J Biosoc Sci. 2000; 32(1): 99-106.

Tabachnick B, Fidell L. Using Multivariate Statistics, 4th edition. HarperCollins College Publishers, New York. 2001.

Velicer WF, Jackson DN. Component analysis versus common factor analysis—Some further observations. Multivariate Behavioral Research. 1990; 25(1), 97–114.

Table 1. Comparison between characteristics of women interviewed (N=992) and of all women (N=2866) attending the family planning clinic at Komfo-Anokye Teaching Hospital between March and July, 2008.

Characteristics	**Study sample (N=992)**	**All women attending the clinic (N=2866)**
Urban residence (%)	85.7	83.8
Age (mean; std dev)	31.3; 6.2	31.7; 6.6
Number of living children (mean; std dev)	2.9; 1.6	2.9; 1.6
Current contraceptive method (%)		
Pill	115 (11.6)	291 (10.2)
Condoms	**34 (3.4)**	**17 (0.6)**
Injectables	**577 (58.2)**	**1854 (64.7)**
Implants	**114 (11.5)**	**175 (6.1)**
IUDs	57 (5.8)	196 (6.8)
Other modern methods	41 (4.1)	137 (4.8)
Traditional methods & no method	54 (5.5)	196 (6.8)

Note: Chi-squared and t-tests were used to identify statistically significant differences shown in bold.

Table 2. Characteristics of clients attending the family planning clinic at Komfo-Anokye Teaching Hospital, Kumasi, Ghana (N=992)

Characteristics	N (%) / mean (std dev)
Residence	
Urban	850 (85.7)
Rural	142 (14.3)
Age (years)	
18-24	143 (14.4)
25-29	284 (28.6)
30-34	249 (25.1)
≥ 35	316 (31.9)
Marital status	
Married/in union	940 (94.8)
Unmarried/not in union	52 (5.2)
Education (years)	8.9 (4.0)
Number of living children	2.9 (1.6)
Religion	
Catholic	110 (11.1)
Anglican/Methodist/Presbyterian	190 (19.2)
Other Christian	620 (62.5)
Muslim	72 (7.3)
Ethnicity	
Akan	827 (83.4)
Other	165 (16.6)
Wealth index	
1st quintile (poorest)	199 (20.1)
2nd quintile	199 (20.1)
3rd quintile	200 (20.2)
4th quintile	205 (20.7)
5th quintile (richest)	189 (19.1)
EC knowledge score*	1.7 (1.3)
Ever had an induced abortion	
No	627 (63.2)
Yes	365 (36.8)
Proportion of months in last 3 years exposed to pregnancy protected by use of contraception	
0.00	406 (40.9)
0.01-0.39	184 (18.6)
0.40-1.00	402 (40.5)
Ever experienced contraceptive side-effects	
No	564 (56.9)
Yes	428 (43.2)
Sexual activity in past 30 days	
At least twice per week	367 (37.0)
1-7 times per month	466 (47.0)

Never	159 (16.0)
Contraceptive method practice intention in next 12 months	
Modern long-term method	741 (74.7)
Modern short-term method or traditional	191 (19.2)
No method	60 (6.1)

Note: EC=emergency contraception; * Score constructed as the sum of correct answers to 7 EC questions.

Table 3. Characteristics of Theory of Planned Behavior-based scales

Scale	Scale items	Mean (std dev)	Cronbach's alpha
Attitudes	1) Using EC would prevent an unintended pregnancy 2) Using EC would prevent an abortion 3) Using EC would not discourage me from consistently using other contraceptive methods 4) Using EC would not encourage me to have unprotected sex 5) Using EC would not pose health risks to me 6) Using EC would not be inconvenient	95.7 (40.8)	0.72
Subjective norms	1) My partner thinks that I should use EC 2) My friends thinks that I should use EC 3) My priest thinks that I should use EC 4) Other community members think that I should use EC	49.3 (29.9)	0.80
Perceived behavioral control	1) I have enough information about EC to be able to use it 2) I do not feel embarrassed to ask medical professionals for EC 3) EC pill shortages do not prevent me from using EC 4) EC pills' cost do not prevent me from using EC 5) Not being suggested by a medical professional to use EC does do not prevent me from using EC 6) Not being given EC to take home and use prospectively does not prevent me from using EC	67.5 (38.6)	0.82
Intention to use EC	1) I intend to use EC if I have unprotected sexual intercourse 2) I intend to use EC if I experience a problem with my contraceptive method 3) I intend to use EC if I experience incest or rape 4) I intend to use EC if I have it at home 5) I intend to use EC if my partner asks me to use it	29.7 (6.0)	0.76

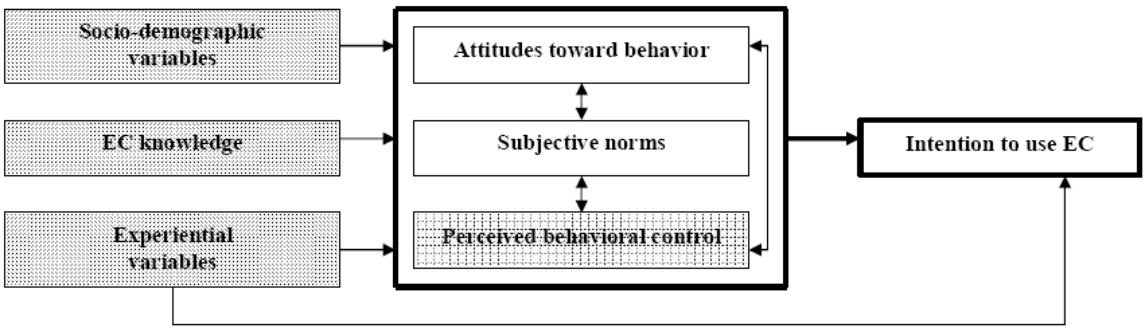
Note: EC=emergency contraception

Table 4. Summary of fit statistics for the Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB) and Extended Theory of Planned Behavior (ETPB) structural models

Model	χ^2	χ^2 p-value	CFI	TLI	RMSEA	SRMSR	R^2
TRA	28.91	0.00	0.99	0.99	0.02	0.01	0.18
TPB	46.88	0.00	0.99	0.99	0.02	0.01	0.26
ETPB	527.48	0.00	0.96	0.96	0.05	0.02	0.34

Note: χ2= chi-squared test; RMSEA=root mean square error; SRMSR=standardized root mean square residual; CFI= comparative fit index; TLI= Tucker-Lewis index; R^2=variance explained by the model.

Figure 1. Conceptual framework for the study of Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB) and Extended Theory of Planned Behavior (ETPB) to explain family planning providers' intention to offer emergency contraception

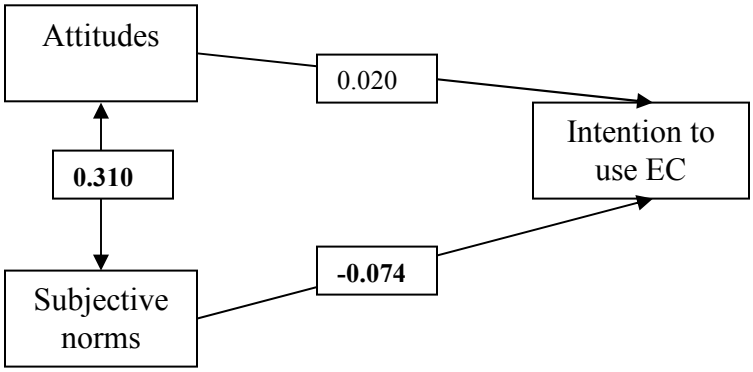


TRA component

Extension TRA → TPB

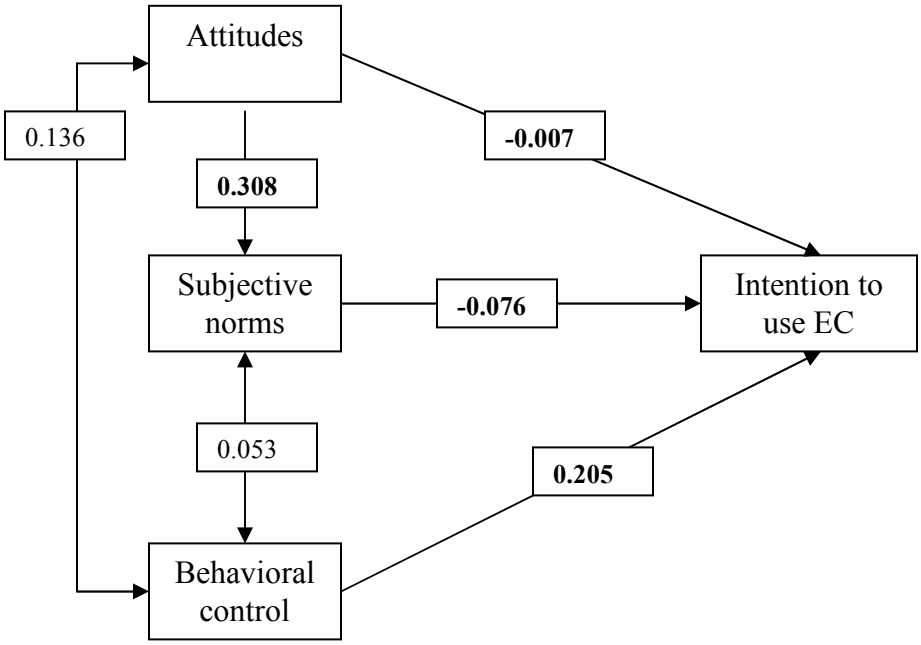
Extension TPB → ETPB

Figure 2a. Standardized path coefficients estimated based on the Theory of Reasoned Action model



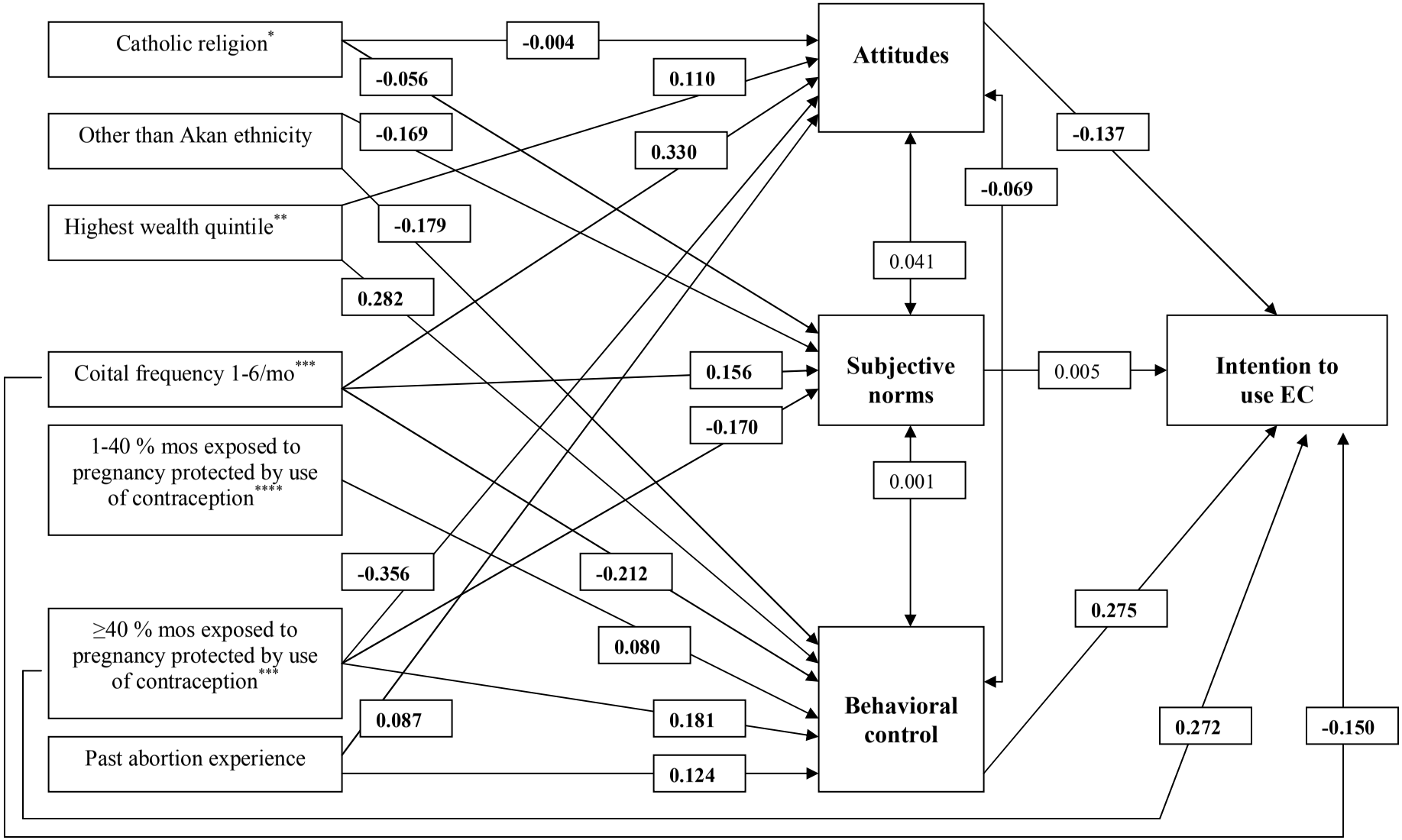
Note: Figures in bold are statistically significant at a level $p<0.05$. Standardized coefficients are presented to facilitate comparison between predictors.

Figure 2b. Standardized path coefficients estimated based on the Theory of Planned Behavior model



Note: Figures in bold are statistically significant at a level $p<0.05$. Standardized coefficients are presented to facilitate comparison between predictors.

Figure 3. Standardized path coefficients estimated based on the Extended Theory of Planned Behavior model



Note: Figures in bold are statistically significant at a level $p<0.05$; only statistically significant coefficients for the paths involving distal variables are presented; standardized coefficients are presented to facilitate comparison between predictors; * Ref=other Christians; ** ref= lowest wealth quintile; *** ref=coital frequency ≥ 2/week; **** ref=non-use of contraception during the calendar period. The model is adjusted for client's place of residence, age, marital status, education, number of living children, dummies for religion, ethnicity, wealth index, EC knowledge score, ever having had an induced abortion, dummies for proportion of months in last 3 years exposed to pregnancy protected by use of contraception, ever having had contraceptive side-effects, sexual activity in the preceding month, method intended for use in the next 12 months.