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Indirect and Direct Perceived Behavioral Control and the Role of Intention in the Context of Birth Control Behavior

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Abstract

Unintended pregnancies can have negative consequences for both mother and child. The focus of this study was to utilize perceived behavioral control measures (PBC; part of the theory of planned behavior) to identify relevant behavioral determinants of birth control use. This study also tested associations between direct and indirect PBC measures and intention of birth control use and between intention and birth control use. The methods included a randomly selected sample of patients at a health care system in the Upper Midwest who were sent a self-administered survey, with 190 non-pregnant women returning completed surveys. Participants indicated a high level of control over using birth control, and a significant positive correlation was observed between direct and indirect PBC measures. Participants also reported high intentions to use birth control, and a significant positive correlation was observed between intention and PBC. Additionally, both PBC measures and intention were independently and significantly associated with behavior, and PBC remained significantly associated with behavior when intention was added into the model. In conclusion, compared to the previous literature, this study is unique in that it examines indirect PBC measures and also the important role that PBC plays with actual birth control behavior.

Keywords

Theory of planned behavior; Perceived behavioral control; Sexual health; Women's health

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Conflict of interest

None of the authors have any financial conflicts of interest to report.

Introduction

Rates of unintended pregnancy vary worldwide, ranging from 38 to 64 %. Although these rates reflect a 20 % decline in the past 10 years, approximately 80 million pregnancies are unintended every year [1, 2]. In the United States, about one-half of all pregnancies are unintended [3, 4], and 43 million women (69 %) of childbearing age are at risk of an unintended pregnancy [5]. A sexually active couple who does not use birth control consistently or correctly has up to an 85 % chance of becoming pregnant within a year [5]. This statistic is concerning, as an estimated 215 million women worldwide who want to avoid a pregnancy are not using an effective method of contraception [6].

Overall, disparities in unintended pregnancies persist due to variations in use, access to birth control, and cost [4, 5]. In addition, knowledge about birth control methods is a strong predictor of actual use [5]. The prevalence and type of birth control use varies by country, although the majority of women in the developed world have used birth control at some point in their lives [4, 7]. In the United States, the pill and female sterilization have been the two most commonly used methods, with 63 % of women who practice birth control using hormonal methods (the pill, patch, injectable method, and implant method), intrauterine devices (IUDs), or condoms [5]. Although birth control use is increasing [8], 38 % of women in one study reported having missed at least one active pill in the prior 3 months, and 61 % of condom users had not used a condom at every sexual encounter [9]. Women who are under 20 years old, who have never been married, and/or who are of a racial or ethnic minority are at higher risk of an unintended pregnancy due to lack of birth control use [4, 5].

Unintended pregnancy can have a negative impact on both maternal and child health. Compared to women with intended pregnancies, those with unintended pregnancies are at a greater risk for later mental health issues, such as postpartum depression [10]. They also have fewer and later prenatal care appointments and are more likely to use alcohol, drugs, and tobacco during pregnancy [10, 11]. Additionally, infants of unintended pregnancies are more likely to face a preterm delivery and be of low birth weight when compared to infants from intended pregnancies [12]. Increased insights into the factors that lead to varying patterns of birth control use may help reduce the occurrence of unintended pregnancies and the potential negative impacts on maternal and child health.

The theory of planned behavior (TPB) can help explain why a woman may or may not use birth control. According to the TPB, a woman's intention, and consequently her actual behavior, is directly influenced by three variables: beliefs about the likely outcomes of using birth control and the evaluations of these outcomes (attitudes); beliefs about the normative expectations of others regarding birth control use and the motivation to comply with these expectations (subjective norms); and beliefs about the presence of factors that may facilitate or impede using birth control and the perceived power of these factors (perceived behavioral control; PBC) [36]. See Fig. 1 for a model of the TPB. PBC is expected to have an indirect impact on behavior through its influence on behavioral intention [13]. As well, PBC is also thought to have a direct effect on behavior, with PBC often used as a substitute for a measure of actual control [13].

The TPB has been used previously in understanding birth control use. Such studies have focused on adolescents [14–21]; college students [22–25]; Middle Eastern women [26–30]; and African American, Hispanic, lower income, and teenage females living in the United States [31–35]. A major gap in this literature is a lack of incorporating both direct and indirect measures of PBC when examining birth control use. Direct measures focus on control over the behavior (how easy or difficult a behavior is to complete), whereas indirect measures focus on the occurrence and perceived power of a factor that makes a behavior difficult or easy to perform. Including both direct and indirect measures can aid in better identifying specific determinants that could be targeted for behavior change. To date, few studies have operationalized indirect measures for any health behavior [36].

The purpose of this study was to test and analyze direct and indirect measures of PBC in the context of birth control use among women. In addition, it aimed to examine the associations between PBC measures, intention, and actual birth control use. The findings from the current study have the potential to inform future interventions to increase use of birth control and therefore positively impact maternal and child health by reducing unplanned pregnancy.

Methods

Participants and Data Collection

Participants for this study were female patients (within the past 3 years) at a health care system in the Upper Midwest of the United States. They were recruited through the health care system's electronic health record (EHR) system. Eligible women were those between the ages of 18–44 years old, currently not pregnant, and English speakers. Institutional review board (IRB) approval was gained from the health care system and the first author's university before data collection began.

With the goal to recruit at least 200 participants and an estimated participation rate of 30 %, 670 women were randomly selected through the EHR system to receive the survey. Each eligible woman received a cover letter, a survey, and a self-addressed, stamped envelope for returning the survey. The cover letter specified that returning a completed survey meant consenting to be part of the research project and analysis. A woman who did not return the survey after 2 weeks received another letter and copy of the survey to encourage a response. A woman who was not interested or currently pregnant was asked to return a blank survey.

Measurements

Demographic variables included age, race and ethnicity, marital status, employment, educational history, and number of previous pregnancies. Birth control use was evaluated with categorical scales (i.e., current method and consistency of use in the past 3 months) used in a previous prevention project [37, 38]. An additional categorical variable was created to indicate the behavior of 'reliable' birth control use and was based on using a reliable form of birth control at each sexual encounter compared to the alternatives of 'no protection' or using a method 'usually,' 'sometimes,' or 'almost never.'

Previous literature on the use of TPB constructs with birth control was utilized to develop PBC questions [33]. The *direct* PBC measure for birth control use was measured by asking,

‘For me to use birth control each time I have sex is...’ and providing a ‘difficult to easy’ Likert response scale. *Indirect* PBC constructs, both control beliefs and perceived power, were measured using a bipolar ‘likelihood of occurrence’ scale score [36]. For example, participants were asked ‘How likely is it to be too expensive for you to buy birth control’ and ‘When birth control is too expensive, I am (circle number related to likelihood) to use birth control each time I have sex,’ both measured on a 7-point likelihood scale (Table 1). An α coefficient of 0.73 was obtained for the bipolar scale. *Intention* was measured using three items: ‘expect to,’ ‘want to,’ and ‘intend’ to use birth control, on a scale of one (strongly disagree) to seven (strongly agree). An α coefficient of 0.98 was obtained for the intention scale. Table 1 lists the specific survey questions administered.

Data Analysis

Once surveys were collected, all data were transferred to the Statistical Package for the Social Sciences (SPSS), version 17.0, database for analysis. To establish the indirect PBC measure score, a new continuous variable was calculated using $(a \times e) + (b \times f) + (c \times g) + (d \times h)$, where a, b, c, and d were scores for the four control belief survey items and e, f, g, and h were scores for the perceived power corresponding to each control belief. Intention was scored by calculating the mean of the three intention questions. The direct measure score was calculated using one question (see Table 1).

Indirect measure, intention, and direct measure scores were analyzed using independent sample *t* tests and ANOVA tests to compare significant differences across demographic groups. Additionally, the correlations between the indirect and direct measure scores and between direct measure and intention scores were tested using the Spearman rho. To test the association between direct measures of PBC and intention and the association between intentions and behavior, hierarchical logistic regression analyses were conducted. The following models were used:

1. Behavior = demographics + intention. The association between intention to consistently use birth control and the reported behavior of consistent birth control use was tested, controlling for demographic factors.
2. Behavior = demographics + PBC. The association between PBC for consistent birth control use and behavior was estimated, controlling for demographic factors.
3. Behavior = demographics + PBC + intentions. Intention was added to analyze the association between PBC (direct measures) and behavior, with and without controlling for intention.

Results

Out of the 670 individuals chosen to participate, a total of 604 women received the survey (the rest of the addresses were incorrect). Of those, 196 (32 %) returned the survey. Six surveys were excluded for missing data, leaving $n = 190$ for analysis. Among participants, the average age was $32.8 (\pm 7.2)$, the average number of previous pregnancies was $1.5 (\pm 1.6)$, and 74 (38.9 %) women were nulliparous. See Table 2 for additional demographic data. In

addition, most participants ($n = 161$; 84.7 %) reported that they were sexually active. Of these, nearly all ($n = 113$; 92.6 % of the 122 who responded) stated they ‘always’ used their birth control method, regardless of method used (i.e., including ‘nothing’). The most commonly used form of birth control was hormonal.

Scores

Direct scores (with a possible range of 1–7) had a mean of 6.4 (± 1.4) for birth control, indicating high perceived control over using birth control. Averages for indirect scores for the control beliefs and perceived power statements are shown in Table 3. Control beliefs (with a possible range of 1–7), averaged 5.1–5.3, and perceived power (with a possible range of –3 to 3), averaged –0.1 to 0.2. The mean intention score (with a possible range of 1–7) was 5.8 (± 2.1). A positive correlation was found between direct and indirect scores ($r = 0.19$, $n = 177$, $p = 0.01$). In addition, a strong, positive correlation was found between direct and intention scores ($r = 0.58$, $n = 177$, $p < 0.001$), suggesting high direct scores were associated with high intention scores.

Of additional note are significant differences by demographic characteristics. Participants with a college degree or higher had significantly higher mean direct PBC scores compared to participants without a college degree ($p < 0.05$). In addition, direct PBC scores increased as age increased ($p < 0.05$). When analyzing birth control intention scores by demographic characteristics, participants who were not married had significantly higher birth control intention scores compared to participants who were married ($p < 0.05$). No significant differences were found in indirect PBC scores when comparing demographics.

Multivariate Analyses

To test associations between PBC, intention, and behavior, the models detailed in the methods section were constructed. Inclusion of each predictor in Model 1 was statistically significant, $\chi^2 (8, N = 150) = 45.88$, $p < 0.001$, indicating that birth control intention was significantly associated with birth control behavior (Table 4). Likewise, inclusion of each predictor in Model 2 was statistically significant, $\chi^2 (8, N = 152) = 28.57$, $p < 0.001$, indicating that PBC was significantly associated with birth control behavior (Table 4). As well, inclusion of each predictor in Model 3 was statistically significant, $\chi^2 (9, N = 147) = 46.95$, $p < 0.001$, indicating that PBC and intention were both associated with birth control behavior, after adjusting for other covariates (Table 4). For each model, none of the demographic variables were significant predictors of birth control behavior. As well, analyses for individual indirect PBC measures, as shown in Table 1, found similar results to what was found when these measures were combined as a single measure in the logistic regression analysis.

Discussion

The current study aimed to measure direct and indirect measures of PBC for birth control use. As was expected, indirect and direct PBC measures were significantly correlated, which fits with the overall premise of the TPB and role of indirect measures [36]. This study also indicated that, in general, participants intended to use birth control at each sexual encounter

as measured by *expect*, *want*, and *intend* (average score of 5.8), which compares to a previous study that found the mean intention score to use birth control pills daily was 5.1 (± 1.9) and mean intention score to use condoms was 6.5 (± 1.2) [16]. Also, the current study showed that PBC was significantly related to intention to use birth control at each sexual encounter, which supports other research findings on the correlation between PBC and intention to use birth control [20, 30]. Because the majority of previous studies on intention and birth control use have focused almost exclusively on adolescents [15, 18, 20] and college-age females [24], this research expands knowledge of birth control intention to a more general population of adult women.

Additionally, the findings from the study showed the significant and direct relationship of PBC and birth control behavior, even when intention was added into the model. The finding of a significant and direct relationship of PBC and birth control behavior is similar to a previous study, which found statistically significant correlations between PBC and birth control behavior [30]. The current study adds to the literature on PBC by conducting analyses adjusted for important covariates and noting the association between PBC and birth control behavior when intention was included in a regression model. This finding supports Ajzen [13] statement that “perceived behavioral control can often be used as a substitute for a measure of actual control”.

The current study is one of only a few studies that has operationalized indirect measures of PBC using control beliefs and perceived power as most previous research highlights *direct* measures of PBC [36]. In fact, only one previous study in published literature incorporated indirect scores for birth control use and observed a mean indirect score of 45.4 for condom use (range of 8–56), suggesting high perceived control for condom use by indirect measures [22]. Overall, indirect measures can be important in identifying specific behaviors that could be targeted in prevention efforts. For example, in the current study, indirect measures of birth control focused on expense of birth control, the embarrassment to obtain birth control, and difficulty both in use and obtaining birth control. While this study did not find significant differences in indirect measures by any demographic feature, future research that utilizes indirect PBC measures might find such differences (i.e., younger women find ‘difficulty in use’ to be a powerful control belief). This would indicate that an intervention could target that particular behavior with that specific subpopulation of women.

Overall, PBC is an important construct in both understanding behavior and also when developing interventions to change behavior. Measuring both PBC and intention in pre- and post-intervention surveys has the potential to provide a more thorough assessment of program impact on behavior, thereby informing potential program improvements. Future research can also further explore this association with other behavioral outcomes. As Ajzen [13] notes, the importance of PBC in predicting behavior is “expected to vary across situations and behaviors”.

Limitations

The clinical sample of the study participants and the lack of variability limit the ability to generalize the study findings to a more racial and ethnically diverse population. This study

did not measure self-efficacy of discussing birth control methods with a sexual partner, of note as sexual activity and often birth control decisions involve partner participation, input, and acceptance. Also, the use of self-report surveys may have led to a response bias, meaning that some participants may have over-reported use of birth control or the control they feel they have over this behavior. Additionally, although cross-sectional studies are often used to test TPB, they may provide a poor prediction and understanding of future behavior because the temporal order of motivations and behavior cannot be discerned [36, 39]. Lastly, the significant but weak relationship observed between indirect and direct measures ($r = 0.19$) may be attributed in part to the wording of the indirect questions, which may have confused some participants.

Conclusion

Indirect measures of PBC have the potential to inform future prevention efforts on unintended pregnancy, therefore this study's inclusion of indirect birth control measures is a valuable contribution to current literature. The significant relationship between PBC and behavior is also a beneficial addition to current literature and reinforces much of the early TPB work. As stated earlier, because the relative importance of PBC measures in predicting intention and behavior will vary among different populations and behaviors [17], future research must include surveys using population-tailored PBC measures before implementing prevention efforts. Additional research is also needed using longitudinal study design to further investigate the relationship between PBC, intention, and birth control behavior.

The findings from this study suggest that PBC plays an important role in behavior, especially when considering birth control use and the prevention of unplanned pregnancy. Future research can screen women using the PBC measures, both direct and indirect, to evaluate how in-control they are of using birth control and focus interventions on feasible behavior changes. In addition, future research should include measures of *both* PBC and birth control self-efficacy to evaluate and compare the impact of internal control and sexual partners on birth control decisions.

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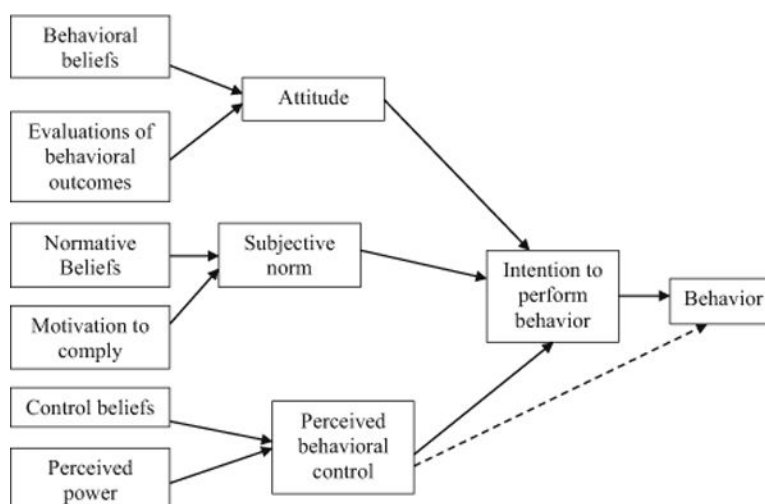


Fig. 1.
Theory of planned behavior conceptual model [36]

Table 1

Direct, indirect, intention, and behavior questions

Direct Question	For me to use <u>birth control</u> each time I have sex is: Difficult 1 2 3 4 5 6 7 Easy
Indirect Questions: Control Beliefs	<p>How likely is it to be too expensive for you to buy birth control? Not at all likely -3 -2 -1 0 1 2 3 Very likely</p> <p>How likely is it to be embarrassing for you to buy birth control? Not at all likely -3 -2 -1 0 1 2 3 Very likely</p> <p>How likely is it that it's hard for you to figure out how to use the birth control correctly (taking a pill at the same time every day or how to use a condom)? Not at all likely -3 -2 -1 0 1 2 3 Very likely</p> <p>How likely is it to be too difficult to get birth control (for example, I have to get a physical exam to get pills or I have to drive to the pharmacy to pick up condoms). Not at all likely -3 -2 -1 0 1 2 3 Very likely</p>
Indirect Questions: Perceived Power	<p>When birth control is too expensive, I am Less likely -3 -2 -1 0 1 2 3 More likely... ...to use birth control each time I have sex.</p> <p>When it's embarrassing to buy birth control, I am Less likely -3 -2 -1 0 1 2 3 More likely... ...to use birth control each time I have sex.</p> <p>When it's hard to figure out how to use the birth control correctly, I am Less likely -3 -2 -1 0 1 2 3 More likely... ...to use birth control each time I have sex.</p> <p>When it is not easy or convenient to get my birth control, I am Less likely -3 -2 -1 0 1 2 3 More likely... ...to use birth control each time I have sex.</p>
Intention Questions	<p>I <u>expect</u> to use <u>birth control</u> every time I have sex. Strongly disagree 1 2 3 4 5 6 7 Strongly agree</p> <p>I <u>want</u> to use <u>birth control</u> every time I have sex. Strongly disagree 1 2 3 4 5 6 7 Strongly agree</p> <p>I <u>intend</u> to use <u>birth control</u> every time I have sex. Strongly disagree 1 2 3 4 5 6 7 Strongly agree</p>
Behavior Questions	<p>Have you had sex in the past 90 days (3 months)? ____ Yes ____ No</p> <p>When you had sex during the past 90 days (3 months), what were you or your partner(s) using to keep you from getting pregnant? Check the one that you use the majority of the time. (list of various contraceptive devices listed)</p> <p>During the past 90 days (3 months), how often did you use this method while having sex? ____ Almost never ____ Sometimes ____ Usually ____ Always</p>

Table 2

Demographic description of participants (N = 190)

Variable	N	%
<i>Race/ethnicity</i>		
Caucasian	178	93.7
African American	4	2.1
Hispanic	3	1.6
American Indian/Alaska native	2	1.1
Asian	2	1.1
Other	1	0.5
<i>Marital status^a</i>		
Married	114	60.0
Single, never married	44	23.2
In a relationship, not married	21	11.1
Previously married	10	5.3
<i>Employment^a</i>		
Employed/self-employed	141	74.2
Homemaker	22	11.6
Student	15	7.9
Out of work/unable to work/other	11	5.8
<i>Education</i>		
College degree	63	33.2
Some college	48	25.3
Associates degree	37	19.5
High school degree or less	25	13.1
Graduate degree	17	8.9

^aMissing n = 1

Table 3

Averages of indirect measures

	Mean (SD)	
	Control beliefs	Perceived power
Expense	5.3 (0.8)	−0.1 (1.5)
Embarrassment	5.2 (0.7)	0.2 (1.4)
Difficulty in use	5.1 (0.6)	0.1 (1.4)
Difficult to obtain	5.2 (0.7)	0.1 (1.6)

Table 4
Summary of multiple logistic regression analysis for variables predicting birth control behavior

	<i>B</i>	S.E.	Wald	<i>df</i>	<i>p</i>	Odds ratio	95 % CI for odds ratio	
							Lower	Upper
<i>Model 1</i>								
Intention score	0.59	0.11	29.01	1	<0.001	1.81	1.46	2.25
Race	0.39	0.45	0.74	1	0.39	1.48	0.61	3.59
Marital status	0.13	0.16	0.63	1	0.43	1.14	0.83	1.57
Employment	0.09	0.18	0.25	1	0.62	1.09	0.77	1.54
Education	0.00	0.24	0.00	1	0.99	1.00	0.63	1.59
Constant	33.81	53.489	6.66	1	0.99	33.44		
<i>Model 2</i>								
Perceived behavioral control	0.81	0.21	14.95	1	<0.001	2.25	1.49	3.39
Race	0.31	0.41	0.56	1	0.46	1.36	0.61	3.03
Marital status	0.25	0.18	1.99	1	0.16	1.28	0.91	1.82
Employment	0.04	0.16	0.08	1	0.78	1.05	0.76	1.43
Education	-0.12	0.23	0.30	1	0.59	0.88	0.57	1.38
Constant	34.26	55.878	0.00	1	1.00	21.40		
<i>Model 3</i>								
Perceived behavioral control	0.51	0.23	4.82	1	0.03	1.67	1.06	2.64
Intention score	0.50	0.12	16.88	1	<0.001	1.65	1.30	2.09
Race	0.08	0.51	0.03	1	0.87	1.09	0.40	2.96
Marital status	0.20	0.20	1.02	1	0.31	1.22	0.83	1.81
Employment	0.03	0.18	0.02	1	0.88	1.03	0.72	1.46
Education	-0.22	0.28	0.64	1	0.42	0.80	0.47	1.37
Constant	33.76	56.393	0.00	1	1.00	24.25		