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Development and Psychometric Testing of the Attitude Toward Potential Pregnancy Scale

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Abstract

Objective—To develop and test a comprehensive tool for measuring women's attitudes toward the possibility of becoming pregnant.

Design—Cross-sectional mixed methods study.

Setting—Two obstetric/gynecologic (OB/GYN) clinics and one family planning clinic in Baltimore, Maryland.

Participants—One-hundred thirty (130) non-pregnant, primarily African American women (84%) ages 18 to 29.

Methods—Participants completed a computer-based survey as part of a larger retrospective mixed methods study. The Attitude Toward Potential Pregnancy Scale (APPS) was assessed using exploratory factor analysis and hypothesis testing.

Results—Cronbach's alpha for internal consistency for the APPS was 0.86. Item-total correlations ranged from 0.56 to 0.75. All items loaded on one factor. Support for construct validity was demonstrated using logistic regression, where the odds of being a highly effective contraceptive user decreased by 8% with each one-point increase in score on the APPS (odds ratio=0.92; confidence interval 0.87–0.98).

Conclusions—This study provides support for reliability and validity of the APPS. The APPS may be a useful tool for understanding pregnancy attitude in future studies and in clinical practice. Further research is needed to assess the usefulness of the scale with other groups of women, its utility in the clinical practice setting, and its potential predictive validity for unintended pregnancy.

Keywords

pregnancy attitude; unintended pregnancy; contraception; psychometric testing

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Unintended pregnancy is a serious health concern for women in the United States, particularly for those less than 30. More than half of all pregnancies in the United States are unintended (Finer & Zolna, 2014), which presents a significant cost to society recently estimated to be \$4.6 billion annually (Trussel et al., 2013). Unintended pregnancy is associated with increased likelihood of numerous adverse maternal outcomes, including engagement in unhealthy behaviors prenatally (Dott, Rasmussen, Hogue, & Reefhuis, 2010), late initiation of prenatal care (Dibaba, Fantahun, & Hindin, 2013), prenatal depression (Fellenzer & Cibula, 2014) and postpartum depression (Mercier, Garrett, Thorp, & Siega-Riz, 2013; Nunes & Phipps, 2013). Unintended newborns are at risk for pre-term birth and low birth weight (Shah et al., 2011). These behaviors and health problems are areas of known maternal-newborn health disparities between poor and middle class women and for African Americans, who experience well-documented disparities in rates of unintended pregnancy compared to other women (Finer & Zolna, 2014; Wildsmith, Guzzo, & Hayford, 2010). Due to the lack of success in reducing unintended pregnancy, the Institute of Medicine (2011) called for improvements in contraceptive services provided to women, congruent with the Healthy People 2020 goals to decrease unintended pregnancy and increase contraceptive use (U.S. Department of Health and Human Services, 2010).

CALLOUT 1

There are a number of methodological challenges in designing research to address unintended pregnancy. One of the most significant issues has to do with the conventional measurement of unintended pregnancy. Specifically, retrospective methods of measurement that are commonly used are often biased, as a woman's views about pregnancy and childbearing may change over time and throughout life (Rosengard, Phips, Adler, & Ellen, 2004; Wesley, 2007; Zabin, Huggins, Emerson, & Cullins, 2000). Another issue has to do with the complicated nature of the concept. Unintended pregnancy is a complex concept (Santelli et al., 2003) that may be difficult to measure as a dichotomous variable that does not easily capture pregnancy ambivalence (Petersen & Moos, 1997; Sable, 1999). Based on the work of Trussel et al. (1999), several authors suggested that pregnancy exists not in a dichotomy of intended versus unintended but across a continuum that allows for other options (Bachrach & Newcomer, 1999; Zabin, 1999). This theory is supported by two recent studies of pregnancy intention. McQuilan et al. (2011) found that 23% of women in a national survey (n=3711) expressed being "okay either way" regarding a pregnancy whereas only 6% defined themselves as trying to become pregnant. Similarly, Nettleman, Brewer, and Ayoola (2009) found that 20% of 84 financially disadvantaged women who said they were not trying to become pregnant and were not using a contraceptive method would be "okay" with a pregnancy.

Conceptually, the definition of intention has been questioned. Several terms such as *intention*, *happiness*, *wantedness*, *planning*, and *trying* have been used interchangeably to describe pregnancy intention (Kavanaugh & Schwarz, 2009; Petersen & Moos, 1997; Rosengard et al., 2004), which creates confusion about what is actually being measured. Intending to become pregnant and wanting to be pregnant are not the same (Petersen & Moos, 1997; Santelli et al., 2003; Trussell, Vaughan, & Stanford, 1999), and there is dissent as to whether happiness and intention are correlated (Sable & Libbus, 2000; Santelli et al.,

2003). In population-level research, the concept of pregnancy intention has been applied across the board to all women (Kavanaugh & Schwarz, 2009), regardless of the fact that it may not be relevant for some groups who do not find the idea of intention to be meaningful (Bachrach & Newcomer, 1999; Kavanaugh & Schwarz, 2009; McQuillan, Greil, & Shreffler, 2011; Moos, Petersen, Meadows, Melvin, & Spitz, 1997; Santelli et al., 2003; Trussell et al., 1999). Furthermore, using terms like planning, intending, and trying assumes forethought, which might not always precede pregnancy (Klerman, 2000; Santelli et al., 2003).

The most clinically relevant methodological issue may be that unintended pregnancy has primarily been studied at the population level using measures that were not designed for individual-level or clinical research (Santelli et al., 2003). At an individual level, women are deciding about whether or not to become parents and whether to do so with a particular partner in a particular situation (Luker, 1999). It is possible that for individual-level clinical research, understanding women's attitudes and emotions about pregnancy in general would provide important information more relevant for clinical care (Sable & Libbus, 2000). This is not to suggest that studying pregnancy intention at the population level should be abandoned; on the contrary, it provides significant information about the health of the nation as a whole. Supplementing this research with studies focused on attitudes toward pregnancy would be beneficial to health care providers who provide contraceptive counseling and services (Schwarz, Lohr, Gold & Gerbert, 2007). To achieve the greatest success in reducing unintended pregnancy, women's attitudes need to be assessed prior to pregnancy using a measurement tool that is both comprehensive and brief enough to have practical application in a clinical setting.

Various methods have been used to measure attitude toward potential pregnancy in previous research. Examples include asking participants about level of happiness regarding a suspected pregnancy (Sable & Libbus, 2000), how much they would like to be pregnant (Davies et al., 2006), whether or not they are trying to become pregnant and level of commitment to not becoming pregnant (Bartz, Shew, Ofner, & Fortenberry, 2007), and how much they want to be pregnant or how upset they would be about a pregnancy (Clarke et al., 2006). Rosengard et al. (2004) asked three questions on being worried, upset, or happy about a potential pregnancy, taking the mean of the three questions to determine the participant's score. Although each of these studies provides important information on how women feel about potential pregnancy, using a limited number of questions does not account for the complexity of emotions that inform behavior (Trussell et al., 1999). Wanting to be pregnant and wanting to prevent pregnancy are not mutually exclusive concepts (Bachrach & Newcomer, 1999); women can both not want a pregnancy and at the same time not be upset about it if it happens (Clarke et al., 2006). We found no existing, theoretically defined instruments for measuring women's attitudes and emotions about potential pregnancy, with the exception of the three-question tool used by Rosengard et al. that may not be extensive enough to capture the broader spectrum of feelings women may have about becoming pregnant. This suggests the need for a more comprehensive method of measuring the complexity of women's attitudes and emotions about potential pregnancy.

As part of a larger study of contraceptive effectiveness, we developed a new tool for measuring women's pregnancy attitudes, the Attitude Toward Potential Pregnancy Scale (APPS). The APPS builds on the following conceptual definition of pregnancy attitudes: a woman's positive and negative emotional outlook toward potential pregnancy including the extent to which she desires to achieve or prevent pregnancy. Items on the APPS were designed to assess emotions about both wanting and not wanting a pregnancy. The new tool uses an uncomplicated, visual anchored scale to measure response patterns and is scored on a continuum by totaling the responses to each of the five questions.

Methods

Sample and Sample Size

Data were collected as part of a larger mixed methods, cross-sectional study designed to examine associations between contraceptive effectiveness, pregnancy attitude, attitude toward motherhood, intimate partner relationship characteristics, and social dynamics (Paterno, 2012). Non-pregnant women were recruited between November 2011 and June 2012 from two OB/GYN clinics and one family planning clinic in Baltimore, Maryland. Study inclusion criteria were between 18 and 29 years of age, able to understand English, and reported engaging in heterosexual vaginal sex within the past 90 days. Women were excluded if they were pregnant at the time of the study, had been pregnant within the 90 days prior to the study, or were unable to become pregnant due to hysterectomy, tubal ligation, or infertility. A total of 134 women agreed to participate in the study. After excluding two women who did not meet study criteria and another two who completed less than half of the survey, the final sample included 130 eligible women.

Several guidelines for adequate sample size for exploratory factor analysis have been proposed ranging from 5 to 20 participants per item, though the number needed is largely dependent on the quality of the data (Costello & Osbourne, 2005; Fabrigar, Wegener, MacCallum, & Strahan, 1999; Strickland, 2003). As the APPS consists of five items, a sample size of 130 provided 26 participants per item, which we deemed to be adequate for psychometric assessment.

CALLOUT 2

Procedures—The institutional review boards (IRB) for Johns Hopkins Medicine and the Maryland State Department of Health and Mental Hygiene approved the study protocol. The Johns Hopkins Medicine IRB reviews research done at the Johns Hopkins Hospital and by investigators at the Johns Hopkins University Schools of Medicine and Nursing. At two recruitment sites, health care providers asked patients if they were interested in speaking with a research team member about the study. For patients who agreed, trained research staff provided a description of the study to the patient in the exam room and invited eligible women to participate. At the third site, a study team member approached patients in the clinic waiting room and then accompanied interested patients to a private office to review study details and informed consent. At all three sites, participants received informed consent and completed the survey in a private place using audio computer-assisted self-interview (ACASI) (QDS version 2.5). ACASI facilitates privacy (Estes et al., 2010; Jones, 2003),

offers the option of hearing questions read aloud for women with lower literacy, and allows for programming of complex skip patterns that can be confusing on a traditional paper-and-pencil survey. It took an average of 15 minutes to complete the entire survey and one minute to answer the questions for the APPS. Each study participant received a \$20 gift card upon survey completion.

Measurements—A questionnaire was developed to ask questions about socio-demographic characteristics and contraceptive practices. We classified participants as highly effective contraceptive users or less effective contraceptive users based on detailed questions about their contraceptive practices during the 90 days prior to survey completion, based on data published by Hatcher et al. (2011). Participants who used an intrauterine device, Implanon, Depo-Provera, NuvaRing, Evra patch, or the pill for the past 90 days were classified as highly effective contraceptive users. Those who used male condoms, female condoms, rhythm/fertility awareness methods, withdrawal, or a diaphragm at *every* act of vaginal sex in the past 90 days were also classified as highly effective contraceptive users. Although these methods are not as effective as long-acting reversible methods and other hormonal methods, they are very effective when used consistently. Participants who used the sponge or spermicide with any degree of consistency and those who used male condoms, female condoms, rhythm/fertility awareness methods, withdrawal, or a diaphragm inconsistently were considered as less effective contraceptive users. Participants using multiple methods over the past 90 days were classified based on the most effective method used. Finally, those who used a method for only a portion of the previous 90 days were classified based on the most current method used at the time of the survey. In addition, the new tool, APPS, was used to assess women's attitude toward pregnancy.

Attitude toward potential pregnancy scale: We generated items in the APPS based on review of existing literature and clinical knowledge (Table 1). Our goal was to capture a variety of aspects of pregnancy attitude, including importance of becoming pregnant, importance of avoiding pregnancy, and how worried, happy, and/or upset the participant would feel if she were pregnant. Some of the items were adapted from questions used in earlier studies (Bartz et al., 2007; Clarke et al., 2006; Davies et al., 2006; Rosengard et al., 2004). Items were written at the 4th grade reading level in consideration of the key demographic characteristics of the target population. Participants responded using a visual analog scale from one to five, with anchors at the two ends. We chose this response method because it is easy to administer and uses straightforward language making it easy to understand for participants (Waltz, Strickland, & Lenz, 2010). The score is the sum of the five items, with items two, three, and four being reverse scored. Possible scores range from 5 to 25, where higher scores correspond to more positive pregnancy attitude.

Using the same inclusion and exclusion criteria, we piloted the survey with 20 women. After completing the survey, these women engaged in cognitive interviewing (Collins, 2003; Drennan, 2003) with a research staff member in order to identify areas of strength and weakness of the survey and gauge response to the APPS and the ACASI system. These interview data informed changes to the final survey. Women in the pilot found the computer

survey easy to use, preferred the computer to a paper-based survey, and responded positively to the visual anchored scale used in the APPS.

Data Analysis—We used descriptive statistics to summarize the characteristics of the study sample. Measures of central tendency and dispersion were used to describe continuous measurements, and frequency distributions were used to describe discrete data. Bivariate associations comparing demographic characteristics of highly effective and less effective contraceptive users were assessed using independent samples t-tests for continuous measures, and Chi-squared tests for discrete measures.

To determine psychometric properties of the APPS, we used Cronbach's alpha for internal consistency of the scale and item-total correlation to assess the consistency of each item. An alpha coefficient above 0.70 and item-total correlations above 0.15 were considered acceptable (Waltz et al., 2010). We examined the scale's validity using exploratory factor analysis with principal axis factoring (Fabrigar et al., 1999). Factors with eigenvalues greater than 1.0 were retained (Costello & Osborne, 2005). Items with factor loadings greater than 0.32 were considered desirable. (Costello & Osborne, 2005). Because all solutions produced models in which only one factor was retained, it was not necessary to rotate the data.

In addition, construct validity was tested using logistic regression. We hypothesized that increasing score on the APPS would be associated with decreased odds of being a highly effective contraceptive user (Frost, Singh, & Finer, 2007; Frost, Duberstein, & Finer, 2012). Statistical significance was determined at $p=0.05$. We used IBM SPSS Statistics version 19.0 for the exploratory factor analysis and reliability calculations; all other analyses were completed using Stata Statistical Software Release 11.

Results

Sample Characteristics

Demographic characteristics of the study sample are shown in Table 2. The median age of study participants was 25 years. The sample was predominantly African American/Black (84%) and with at least seven out of ten reporting monthly household income less than \$1,000. Slightly more than half (51%) were married/co-habiting and only 47% had some post-secondary education. About half (49%) were employed at the time of the study and 68% had health care coverage through private insurance or medical assistance. No statistically significant demographic differences were found between highly effective and less effective contraceptive users.

Descriptive Psychometric Statistics

The mean score on the APPS for the entire sample was 13.1 with a range from 5 to 25. The Cronbach's alpha reliability coefficient for the five items on the APPS was 0.86, well above the acceptable level of 0.70 for a new instrument. All item-total correlations were also above the cutoff set a priori at 0.15, ranging from 0.56 to 0.75 (Table 1). There was a statistically significant difference in mean scores on the APPS comparing highly effective and less effective contraceptive users ($t=2.5$; $p=0.01$), indicating that women who were less effective

contraceptive users had higher mean scores on the APPS and more positive pregnancy attitudes.

Exploratory Factor Analysis

All five items loaded on one factor with a range of factor loadings from 0.59 to 0.84 (Table 1). The scree plot showed a clear break after the first datapoint and only the first datapoint had an eigenvalue greater than 1.0, indicating that one dimension was captured by the five items on the scale. Fifty-six percent of the variance in pregnancy attitude was explained by the APPS after extraction.

To determine that the initial solution provided the cleanest factor structure, we initiated several subsequent steps. We attempted to manually extract two factors but were unable to complete the extraction due to communality exceeding 1.0. We then systematically dropped items two through five one at a time and ran a series of factor analyses with the remaining four items to determine if any grouping of four items provided a better solution. Dropping items did not significantly alter the reliability of the scale. Only when we dropped item two (“How important is it to you to avoid becoming pregnant now?”) did we see any difference in the factor analysis; this iteration increased the variance explained from 56% to 62%.

Construct Validity Testing

To establish construct validity, we used logistic regression (Waltz et al., 2010). APPS scores were regressed on contraceptive effectiveness. The odds of being a highly effective contraceptive user decreased by 8% with each one-point increase in score on the APPS (odds ratio=0.92; confidence interval 0.87–0.98), providing some evidence for construct validity. The Hosmer and Lemeshow goodness of fit test demonstrated that the model fit the data well ($\chi^2=7.76$; $p=0.35$)

Discussion

Psychometric testing of the APPS demonstrated support for reliability and validity. Specifically, the scale exhibited high internal consistency and item-total correlations. Exploratory factor analysis revealed a one-factor solution, with 56% of the variance on the APPS explained. Testing of various four-item versions of the scale revealed that eliminating item two explained an additional eight percent of the variance. Despite this, we elected to leave this item in the final scale because the item was deemed theoretically important in understanding attitude toward potential pregnancy.

Hypothesis testing using logistic regression supported the APPS. This finding is consistent with previous research on contraceptive behavior with a large, nationally representative sample. Frost et al. (2007) found that women who would be happy about a pregnancy and those who did not express avoiding pregnancy to be important were less likely to use a contraceptive method. In another smaller study (Kraft et al., 2010), women’s feelings about becoming pregnant were not associated with contraceptive effectiveness. This difference could be attributable to geographic or ethnic differences in the study sample, as Latina women from Los Angeles and Oklahoma City comprised nearly 50% of participants in the Kraft et al. study. Additionally, each of these studies used a single question to capture only

one aspect of pregnancy attitude, which could contribute to the differing results. Miller, Trent, and Chung (2014) found that the interaction of positive and negative childbearing motivations predicted condom use in a study of urban, African American women, underscoring the importance using a sufficient number of questions to measure both positive and negative emotions related to pregnancy.

CALLOUT 3

The APPS provides new insight into women's feelings about potential pregnancy, as it uses five distinct questions to understand overall attitudes and emotions. The combined comprehensiveness and brevity of the scale and the acceptability of the questions to a clinical study population suggest that the APPS has the potential to be used in future research as well as clinically by health care providers seeking to more fully understand women's feelings about pregnancy. For example, in a randomized controlled trial of contraceptive method choice among women presenting for clinical care, Garbers, Meserve, Kottke, Hatcher, and Chiasson (2013) found that women with a history of unintended pregnancy and those who were not using a contraceptive method were less likely to obtain a contraceptive method compared to women without these risk factors. This was true even though participants in the study defined themselves as not currently trying to become pregnant. Unintended pregnancy among women not seeking pregnancy may be reduced through tailored contraceptive counseling. Such counseling may be more effective when informed by women's emotions about potential pregnancy and the context in which they make childbearing and contraceptive decisions.

There are several limitations to the study. The homogenous, convenience sample was recruited from one geographic area and was limited to women presenting for care at OB/GYN and family planning clinics. Volunteer bias, non-respondent bias, and recall bias related to retrospective measurement of contraceptive practices may also have been present. Because contraceptive use was measured retrospectively and the survey was cross-sectional, we are unable to establish the predictive validity of the APPS in relation to future contraceptive effectiveness. Strengths of the study include use of ACASI for data collection, pilot testing of the survey, and cognitive interviewing to determine face validity of the survey and identify areas for revision. We also focused on a predominantly low-income, African American sample at high risk for unintended pregnancy. In future research, we recommend testing the APPS with other racial, ethnic, and age groups as well as using the scale in prospective studies to determine its ability to predict reproductive outcomes over time.

Conclusion

We present a new, five-item scale for measuring attitude toward potential pregnancy with demonstrated reliability and validity when applied to a primarily African American, urban sample. Additional studies are needed to determine the usefulness of the scale with other groups of women. The results of this study have implications for both women's health and nursing science. The APPS may be useful in better understanding the complexity of women's feelings about potential pregnancy. This could be helpful to clinicians aiming to

provide individualized contraceptive and family planning services by providing a strong basis for contraceptive counseling. The APPS could also serve as a means to initiate discussion about adoption of healthy behaviors prior to pregnancy, particularly among women with positive pregnancy attitudes who are not actively planning a pregnancy. Future research should focus on the acceptability and feasibility of using the tool clinically among health care providers and prospective measurement of pregnancy attitude in relation to future pregnancy. Such research may help achieve the goal of reducing unintended pregnancy in the United States through improved provision of contraceptive services.

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Callouts

Callout #1 – Attitude toward potential pregnancy should be assessed using a measurement tool that is comprehensive and brief enough to have practical application in a clinical setting.

Callout #2 – The Attitude Toward Potential Pregnancy Scale has five questions designed to assess multiple emotions and allows for wanting and not wanting a pregnancy.

Callout #3 – The APPS could provide a strong basis for contraceptive counseling and serve to initiate discussion about adoption of healthy behaviors prior to pregnancy.

Table 1

Attitude toward Potential Pregnancy Scale

Items	Anchors		Factor Loading	Factor Loadings and Item-Total Correlation	
	Low (1)	High (5)		Item-Total Correlation	Cronbach's Alpha if Deleted
1. How much do you want to be pregnant now?	Not at all	Very much	.71	.65	.84
2. How important is it to you to avoid becoming pregnant now?	Not at all important	Very important	.59	.56	.86
3. How worried would you be if you were pregnant now?	Not worried at all	Extremely worried	.74	.69	.83
4. How upset would you be if you were pregnant now?	Not at all upset	Extremely upset	.83	.74	.81
5. How happy would you be if you were pregnant now?	Very unhappy	Very happy	.84	.75	.81

Note. Items 2, 3, and 4 are reverse scored. The total score is the sum of the five items. Higher scores correspond to more positive pregnancy attitude.

Table 2

Demographic Characteristics of Study Sample

	Overall, N=130 n(%)	Highly Effective N=81 n(%)	Less Effective N=49 n(%)	Statistical Test	P
Age, mean	24.6	24.7	24.5	<i>t</i> = 1.14	.96
Race					
African American/Black	109 (83.8)	65 (80.3)	44 (89.8)	$\chi^2 = 2.06$.15
Other	21 (16.1)	16 (19.7)	5 (10.2)		
Income^a					
\$708	68 (53.1)	40 (50)	28 (58.3)	$\chi^2 = 1.69$.43
\$709–908	22 (17.2)	13 (16.3)	9 (18.8)		
\$909–6966	38 (29.7)	27 (33.7)	11 (22.9)		
Relationship Status					
Married/co-habiting	66 (50.8)	43 (53.1)	23 (46.9)		
Never married	54 (41.5)	33 (40.7)	21 (42.9)		
Other	10 (7.7)	5 (6.2)	5 (10.2)	$\chi^2 = .91$.64
Education					
High school	72 (55.4)	43 (53.1)	29 (59.2)	$\chi^2 = 1.34$.51
Some college/trade school	24 (18.5)	14 (17.3)	10 (20.4)		
Completed 2-year college	34 (26.1)	24 (29.6)	10 (20.4)		
Employed	64 (49.2)	43 (53.1)	21 (42.9)	$\chi^2 = 1.28$.26
Health Care Coverage					
Insurance/medical assistance	88 (67.7)	57 (70.4)	31 (63.3)	$\chi^2 = .71$.40

^aNote. two participants refused to answer, one from each group.