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**UNIVERSITY OF SAN DIEGO
Hahn School of Nursing and Health Science
DOCTOR OF PHILOSOPHY IN NURSING**

**DEVELOPMENT OF THE POSTPARTUM SMOKING QUESTIONNAIRE
(PPSQ)**

by

Cynthia J. Gantt, MSN, RN, C-FNP

**A dissertation presented to the
FACULTY OF THE HAHN SCHOOL OF NURSING AND HEALTH SCIENCE
UNIVERSITY OF SAN DIEGO**

**In partial fulfillment of the
requirements for the degree
DOCTOR OF PHILOSOPHY IN NURSING
May 2002**

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Abstract

Cigarette smoking is the leading preventable cause of death in the United States. Smoking also accounts for significant morbidity for others exposed to environmental tobacco smoke. Many women stop smoking during pregnancy. Most women relapse to smoking following delivery, yet postpartum smoking issues have received little attention. The purpose of this study was to develop and test an instrument, the Postpartum Smoking Questionnaire (PPSQ) using Ajzen's Theory of Planned Behavior. The belief-based items of the PPSR-Q were developed following content analysis of 35 individual, structured elicitation study interviews with postpartum women in the military healthcare system. Beliefs that prevented women from smoking included: worrying about the health of family members due to one's own smoking, wanting to be a positive role model for children, and wanting to live longer. Stress management, addiction, and getting a break from the baby were reported as modal beliefs that contributed to postpartum smoking. Pilot testing of the PPSR-Q was conducted using test-retest reliability and item-to-total score correlation techniques. Suggested nursing interventions are presented based on the elicitation study results. Following further development and psychometric testing, the PPSQ will be used to guide the development, implementation, and evaluation of effective, targeted behavioral interventions that will reduce postpartum smoking rates.

Dedication

To my parents Louis and Norma Nash, whose love, confidence, and pride in me will always be a source of comfort and motivation.

To my husband Bob, whose love, support, and wonderful care of our family have enabled me to achieve this goal.

To my son Justin, who has always believed that I would complete my doctoral studies, and who teaches me about resilience.

To my daughter Jessica, whose arrival during this journey has been a source of great joy and many pleasant distractions.

To my daughter Mei Mei, whose impending arrival has been a wonderful reason to persevere.

To the United States Navy Nurse Corps who afforded me this wonderful, once-in-a-lifetime opportunity.

Acknowledgments

This dissertation was completed with the diligent guidance of my dissertation chair, Dr. Linda Robinson. I am deeply grateful for Dr. Robinson's ongoing interest in my area of research, her persistence, and willingness to read multiple versions of this work.

Dr. Major L. King provided invaluable support for my study. His confidence in my ability to complete this work was a vital source of inspiration. Dr. King's experience with the Theory of Planned Behavior was invaluable in the writing of this dissertation. I look forward to working with him in the future.

I deeply appreciate all the detailed comments made by Dr. Louise Rauckhorst. I have learned important lessons about clarity in writing from Dr. Rauckhorst that will guide me in my future scholarly endeavors.

I would like to gratefully acknowledge the guidance and encouragement of Dr. Kenneth Brodeur. Dr. Brodeur's keen insights into research design and statistical analysis are deeply appreciated.

Nancy Holub, MSN, RN, CNM provided ongoing enthusiasm and support for my study. She led an active recruitment for study participants in her practice setting, and served as the research assistant for the study, conducting interrater reviews of study interviews. Thank you so much!

I am convinced that this study would not have been completed without the help of my friend and colleague, Bernadette C. O'Hara, BA, CDAC. Bernadette has seen me through all five years of my doctoral studies. She energetically recruited study participants, and has provided me with hours of support. Bern, I truly could not

have done this without you!

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Chapter 1

Introduction

This chapter includes an overview of the study, including the background and significance of the phenomenon of postpartum smoking, and a brief overview of the theoretical framework chosen for the study. The purpose of this study was to develop and test an instrument, the Postpartum Smoking Questionnaire (PPSQ). The Theory of Planned Behavior was used as the theoretical framework for the study. Participants in the study were postpartum women who were eligible for health care in the military health care system. Information concerning specific military sociodemographic variables is included.

Background and Significance

Smoking is the leading cause of preventable death in the United States (McGinnis & Foege, 1999). Lung cancer is the leading cancer-killer of women, and cigarette smoking is also a strong contributor to cardiac disease, which is the leading cause of death among adult women. Eleven percent of all women die prematurely because they smoke cigarettes (Scheibmeir & O'Connell, 1997). Yet, it is not only the women smokers themselves who suffer the consequences of smoking. Other individuals, especially children who are living with smokers, also suffer the ravages of environmental tobacco smoke (ETS) exposure. ETS is a significant causative factor for increased rates of respiratory illnesses and sudden infant death syndrome (SIDS) (DiFranza & Lew, 1996; Guyer, 1999). Environmental tobacco smoke has

also been implicated in increased incidences of learning disabilities and behavior problems such as attention deficit disorder (Charlton, 1994; DiFranza & Lew, 1995; Guyer, MacDorman, Martin, Peters, & Strobino, 1998; Morrow, 1995; Scheibmeir & O'Connell, 1997). Astoundingly, 25% of deaths from home fires are attributed to smoking in the home (USDHHS, 1996).

The number of women who smoke during pregnancy has been reduced because of targeted messages about the adverse effects of smoking on fetal development and associated neonatal complications (Birenbaum-Carmeli, 1995). Yet the limited focus on smoking during pregnancy by nurses and other health care providers has not resulted in sustained postpartum abstinence, much less life-long smoking avoidance, by women.

Theoretical Framework

Following an extensive review of the literature related to smoking relapse in general (Gantt, 1998), the term “motivation” became the guiding concept in the search for a theoretical framework. Specifically, the research question emerged as, “What *motivates* women to smoke cigarettes following delivery?” Motivations are directly tied to beliefs about a behavior (e.g., smoking). Identification of and an understanding of the beliefs associated with cigarette smoking in postpartum women is an essential first step toward the development of population specific hypotheses regarding postpartum smoking behaviors. Ultimately, an understanding of the motivations that underlie a given behavior in a specific population significantly assists and improves the design of effective intervention programs (Godin, Naccache, & Fortin, 1998).

A literature search of motivation theories resulted in the identification of studies using the Theory of Planned Behavior. The Theory of Planned Behavior was designed to explain and predict behaviors. In brief, the Theory of Planned Behavior posits that behavior is determined by intention, and that intention, in turn, is determined by the direct measures of attitude, subjective norm, and perceived behavioral control. The theoretical antecedents to the direct measures are the belief-based or indirect measures of attitude, subjective norm, and perceived behavioral control. The belief-based measures are generated from an elicitation study conducted with individuals from the population to be studied (Ajzen, 1991). Identifying these measures will assist instrument construction, and the development and implementation of effective smoking avoidance interventions targeted towards changing postpartum women's beliefs about smoking.

Specific Aims

The specific aims of this study were to:

1. Elicit behavioral, normative, and perceived behavioral control beliefs about smoking among postpartum women.
2. Construct an instrument, the Postpartum Smoking Questionnaire (PPSQ), to measure smoking intentions of smoking and non-smoking postpartum women based on the Theory of Planned Behavior.
3. Pilot test the Postpartum Smoking Questionnaire (PPSQ) for feasibility, validity, and establishing preliminary reliability.
4. Measure variables external to the Theory of Planned Behavior, but related to the PPSQ for the purpose of sample description.

The PPSQ will ultimately be used to evaluate the adequacy of Ajzen's Theory of Planned Behavior to predict cigarette smoking intention in postpartum women in the military health care system.

Assumptions

The basic assumptions upon which this study of postpartum smoking relapse was based were:

1. Smoking is a cause of significant morbidity and mortality that is preventable.
2. Most women report that they do not want to return to smoking following delivery.
3. Most women do not make a plan to abstain from smoking after delivery.
4. Pregnancy is a powerful motivational state that promotes smoking avoidance.
5. Abstinence during pregnancy provides a window of opportunity during which efforts to prevent smoking relapse can be directed toward women.
6. Little is known about the phenomenon of postpartum smoking behaviors and, therefore, effective smoking avoidance strategies are presently lacking, or are poor at best.

Chapter 2

Review of Related Literature

This chapter provides a review of relevant multidisciplinary literature about smoking related morbidity and mortality, nicotine addiction and relapse issues, perinatal smoking cessation and relapse, and variables specific to the postpartum experience. An in-depth review of the Theory of Planned Behavior, including theoretical components and clinical studies using this theoretical framework is also presented.

Smoking-Related Morbidity and Mortality

Cigarette smoking is the leading preventable cause of morbidity and mortality in the United States (McGinnis & Foege, 1999). Cigarette smoking is responsible for 11% of deaths among women (Scheibmeir & O'Connell, 1997). The total percentage of people who smoke has decreased in the United States, but the prevalence of smoking among women is declining at a slower rate than in men. Moreover, women are initiating smoking at higher rates than men, and appear to have more difficulty quitting and remaining abstinent over the long term (Marcus et al., 1995). Cigarettes have been described as “a worldwide health threat” because of the dire health consequences of smoking (Brigham, Henningfield, & Stitzer, 1990, p. 1250).

The U. S. Department of Health and Human Services (USDHHS) *Healthy People 2010* objectives related to perinatal smoking include: (a) prenatal smoking is to be reduced to 2% (baseline: 13% of all pregnant women in 1997), and (b) reduce to

no more than 10% the proportion of children 6 and younger exposed to tobacco smoke at home (baseline: 27% in 1994) (U. S. Department of Health and Human Services, 2000). Although no specific target is given for decreasing the rate of postpartum relapse, the *Healthy People 2000* objectives report stated, "Smoking cessation programs for pregnant women should also address the issue of postpartum relapse" (USDHHS, 1991, p. 146). The USDHHS also calls for research on preventing relapse for all smokers (Windsor, Li, Perkins, Ershoff, & Glynn, 1993).

The deleterious effects of smoking extend beyond the individual smoker to the children and other nonsmokers who live and work with smokers. Maternal smoking is a known risk factor for sudden infant death syndrome (SIDS), as well as a myriad of health problems, most notably middle ear effusions and childhood asthma. Passive smoking by children has been estimated to cause 8,000-26,000 new cases of asthma a year. Moreover, exposure to environmental tobacco smoke causes increased symptoms in 200,000 to 1,000,000 known asthmatics (Charlton, 1994; DiFranza & Lew, 1995; Guyer et al., 1996; Morrow, 1995). Some studies have implicated cigarette smoking as a contributory factor in cases of learning problems and behavior problems such as attention deficit disorder (ADD) (Charlton, 1994). Moreover, smoking-related health care costs are astronomical. Smoking-attributable costs for health care in the US in 1993 were \$50 billion, and excess lifetime medical costs due to smoking may be as high as \$500 billion (Miller, Zhang, Rice, & Max, 1998).

Postnatal Smoking Cessation and Relapse

Although over 90% of pregnant women state they intend to remain abstinent from smoking after delivery, 56% of women have returned to smoking at six months

postpartum, and an astounding 70 to 95% have relapsed to smoking at one year (NHSDA, 2001). Of those who did relapse to smoking, 67% resumed smoking at three months, and 93% within six months (Ershoff, Quinn, & Mullen, 1995; Fingerhut, Kleinman, & Kendrick, 1990; McBride & Pirie, 1990).

A large body of research exists that explored a variety of approaches and explanations of prenatal smoking cessation (e.g., Hutchison, Stevens, & Collins, 1996; Lowe, Windsor, Balanda, & Woodby, 1997; O'Connor, et al., 1992). Interestingly, many women either quit, or drastically reduce their smoking during pregnancy, only to relapse shortly following delivery (Brenner & Mielck, 1993; Ershoff, Mullen, & Quinn, 1989; Fingerhut, Kleinman & Kendrick, 1990; Higgins, Frank, & Brown, 1994; McBride, 1990; McBride, Pirie, & Curry, 1992; Morrow, 1995; Scheibmeir & O'Connell, 1997). Severson, Andrews, Lichtenstein, Wall, and Zoref (1995) report 20-40% of women who smoke quit during pregnancy.

Surprisingly few prenatal studies have extended their investigations and interventions into the postnatal period. Only in the last 15 years have isolated studies appeared in the literature that focus on postpartum smoking relapse. Graham's (1987) qualitative and quantitative study in Britain is a poignant portrait of the central role cigarette smoking plays in the lives of low-income mothers. The 54 women in the study depended on cigarettes for mood control, including avoiding directing anger toward their children, and as an important mechanism for controlling stress. Graham goes on to conclude that the physical act of smoking creates a symbolic and physical space between the women and their children that they need due to the stresses of poverty and unemployment.

Bottorff, Johnson, Irwin, and Ratner (2000) also conducted a qualitative study using a narrative approach in obtaining the postpartum smoking relapse stories of 27 women. Five general “story lines” were elucidated: (a) controlling one’s smoking, (b) being vulnerable to smoking, (c) nostalgia for one’s former self, (d) smoking for relief, and (e) never really having quit (i.e., relapsing because they did not quit for themselves).

McBride, Pirie, and Curry (1992) conducted a prospective, descriptive study of postpartum relapse to identify prenatal psychosocial variables that predicted smoking relapse. Social learning theory and the health belief model were the theoretical frameworks used to guide the study. Women (N = 106) who had quit smoking by 28 weeks of pregnancy were contacted at 6 weeks and 6 months postpartum and their smoking status and pertinent demographic variable ascertained. Non-smoking status was confirmed using biochemical testing. They found that having a spouse who smoked, a decreased level of self-efficacy, and having a spouse perceived as “helpful” were predictors of postpartum smoking relapse. Type of coping strategy employed was found to be the best predictor of smoking status.

Stotts, DiClemente, Carbonari, and Mullen (2000) used the Transtheoretical Model (TTM) to classify 256 pregnant women who had quit smoking without any smoking cessation intervention into one of four stages of change (i.e., precontemplation, contemplation, preparation, and action). In the first stage, precontemplation, a person is not intending to take any action to change their behavior. In the next stage, contemplation, a behavior change in the next six months is being considered. Just prior to delivery, most pregnant women have been classified

in the third and fourth stages, preparation and action respectively. The preparation stage includes individuals who are intending to take some action in the immediate future. The time frame for action includes any concrete change in behavior that has taken place within the last six months.

As hypothesized, those women classified in the “earlier” stages of change (i.e., “precontemplation”) experienced higher rates of postpartum smoking than in women who were farther along the continuum of change (i.e., “action”). However, post hoc analyses revealed that the full staging model was not necessary to predict postpartum smoking relapse. The individual staging item, “perceived likelihood of smoking” postpartum “was found to be comparable to the full staging algorithm” (p. 331).

A total of six stages of health behavior change are included in the full TTM (Prochaska & Velicer, 1997). In the fifth stage, maintenance, the individual no longer has to apply change processes as frequently as is required in the earlier action stage. In this maintenance stage, there are fewer temptations and an increased level of self-confidence compared to the action stage. Astonishingly, the maintenance stage is estimated to last from 6 months to 5 years. The sixth and final stage is labeled termination. The termination stage is achieved when an individual experiences no temptation and complete self-efficacy. However, Prochaska and Velicer (1997) state that, “termination may not be a practical reality for a majority of people” (p. 39).

Only four postpartum intervention studies with 6 to 12 month follow-ups are reported in the literature. Secker-Walker et al. (1995) found no difference in postpartum smoking relapse rates at six months following delivery for 165 women

randomized into one of two groups: those receiving “usual” smoking cessation advice from their health care provider, and women also receiving individual relapse prevention counseling. Severson, Andrews, Lichtenstein, Wall, and Akers’ (1997) study provided written ETS information to both current and former smokers (N = 2,901) during well-baby visits in pediatric clinics. Women receiving advice and written materials during well-baby visits were compared with women who received advice and materials only once at the time of hospital discharge following delivery. At 12 months there was no significant difference in the relapse rates between the two groups.

McBride et al. (1999) studied 897 women who quit smoking during pregnancy by randomizing them to one of three groups who were provided with: (a) prenatal cessation booklet information only, (b) prenatal and relapse prevention information, including telephone counseling, or (c) all of the foregoing, plus postpartum telephone counseling and a postpartum newsletter. At 12 months, there was no significant difference between the intervention groups in their smoking relapse rates.

Johnson, Ratner, Bottorff, Hall, and Dahinten (2000) randomized 238 postpartum women to either a control group (“usual” care), which did not include formal tobacco reduction counseling), or a treatment group. Women in the treatment group received (a) individual counseling in the hospital following delivery; (b) written materials to reinforce abstinence; and, (c) eight at-home telephone counseling sessions by a nurse. At six months there were no significant difference in smoking status and levels of self-efficacy between the control and treatment groups.

In summary, none of the randomized intervention studies using educational

materials and various forms of counseling have been shown to be effective in reducing postpartum smoking rates. Additionally, none of the theoretical frameworks have proven to be comprehensive in explaining or predicting postpartum smoking relapse. It is increasingly evident that prenatal smoking avoidance is a time-limited restriction of use rather than an intentional behavior change and the data suggest that relapse may not be an appropriate term for the return to smoking postpartum. Stotts et al. (2000) refers to this phenomenon as a “suspension” of smoking rather than true abstinence. Therefore, they conclude that the approach to women who have quit smoking during pregnancy should be much the same as for persons preparing to or having recently quit smoking rather than the use of interventions directed toward maintaining abstinence.

Sociodemographic Variables

Several sociodemographic variables have been associated with those persons more likely to smoke cigarettes in both the general and postnatal populations. A lower level of education is the only demographic variable that has consistently been shown to describe individuals most likely to smoke cigarettes across populations. Individuals with less than a high school education are more than three times as likely to smoke than those with a college education (Fingerhut et al., 1990; Hutchison, Stevens, & Collins, 1996; Johnson, Ratner, Bottorff, Hall, & Dahinten, 2000; McBride & Pirie, 1990; Morrow, 1995; Severson, Andrews, Lichtenstein, Wall, & Zoref, 1995). Some studies have demonstrated that younger age may contribute to smoking relapse (McBride & Pirie, 1990), while other studies with prenatal and postnatal measures have shown that age was not associated with smoking status

(Fingerhut et al., 1990; O'Campo, Faden, Brown, & Gielen, 1992; Severson et al., 1995). Age at which women began smoking was also not found to be predictive of postpartum smoking status by Secker-Walker et al. (1995). In their large descriptive studies of women before, during, and after pregnancy, Fingerhut, Kleinman, and Kendrick (1990) found that age, marital status and education were not significant predictors of postpartum relapse. O'Campo, Faden, Brown, and Gielen (1992) also reported that the same findings. Moreover, they also found that ethnicity was not a predictor of smoking relapse. However, in a large retrospective, descriptive study with over 4,000 postpartum women, logistic regression analyses found that African-American ethnicity was independently correlated with postpartum smoking relapse (Carmichael, Ahluwalia, & PRAMS Working Group, 2000).

Stress

Stress has been another variable implicated as a strong contributing factor to smoking relapse. Many smokers report they smoke cigarettes as a means of stress reduction. Wewers and Lenz (1987) developed a theory of smoking relapse that proposes that stress predicts smoking status; that is, those with lower reported stress levels were significantly less likely to be smoking at follow-up. Swan et al. (1988), Cohen and Lichtenstein (1990), and Wewers (1988) report similar findings. McBride, Pirie, and Curry (1992) found that postpartum women with few coping strategies were most likely to relapse to smoking. Carmichael et al. (2000) found that postpartum women reporting five stressful life events in the last year were 1.8 more times more likely to relapse than women reporting no stressful events. In contrast, Pollak and Mullen's study of postpartum women (1997) did not find stress level to be

associated with smoking relapse.

Partner Smoking Status

Partner smoking status is another significant predictor of an individual's own smoking behaviors. Numerous studies demonstrate that having a partner who smokes makes remaining abstinent very difficult in the perinatal period as well as in the general population (Gibbons & Eggleston, 1996; Gulliver, Hughes, Solomon, & Dey, 1995; Johnson et al., 2000; McBride et al., 1998; Mullen, Richardson, Quinn, & Ershoff, 1997; Ratner, Johnson, Bottorff, Dahinten, & Hall, 2000; Severson et al., 1995; Wall et al., 1995).

Nicotine Dependence

Nicotine is listed as an addictive substance in the *Diagnostic and Statistical Manual of Mental Disorders IV (DSM IV)* (American Psychiatric Association, 1994). The *DSM IV* identifies nicotine dependence as a "cluster of cognitive (or psychological), behavioral (or habitual), and physiological symptoms whereby the individual continues the use of the substance despite significant substance-related problems" (p. 176). Nicotine dependence can occur without physiological dependence. Postpartum women who return to smoking after any period of abstinence greater than two to four weeks are experiencing psychological dependence without a physiological component.

Level of addiction to cigarettes, (more recently termed nicotine dependence) is a variable included in many smoking cessation and relapse studies. This construct can be measured in various ways. The number of cigarettes previously smoked (Carmichael et al., 2000; Fingerhut et al., 1990); number and length of previous quit

attempts (Hu & Lanese, 1998; Norman, Bell, & Conner, 1999), and levels of craving (Wewers & Lenz, 1987) have been included in smoking relapse studies. Not surprisingly, many studies have shown that an increased level of addiction is associated with an increased rate of relapse (Carmichael et al., 2000; Hutchison et al., 1996; Killen et al., 1996; McBride & Pirie, 1990; McBride, Pirie, & Curry, 1992; Morrow, 1995; Ratner et al., 2000).

Degree of nicotine dependence has been measured using the Heavy Smoking Index (HSI). The HSI consists of the two most reliable questions from the six questions on the Fagerstrom Test for Nicotine Dependence (FTND). The two questions on the Heavy Smoking Index are: (a) How soon after you wake up do you smoke your first cigarette; and (b) How many cigarettes a day do you smoke? (Heatherton, Kozlowski, Frecker, & Fagerstrom, 1991; Kozlowski, Porter, Orleans, Pope, & Heatherton, 1994). Both questions are scored from 1 to 4. A higher score indicates a greater degree of dependence. The widespread use of the FTND has resulted in substantial reliability and validity data for this instrument (Heatherton et al., 1991; Kozlowski et al., 1994; Prokhorov et al., 2000). Pomerleau, Carton, Lutzke, Flessland, and Pomerleau (1994) undertook two studies to assess the test-retest stability of the FTND ($N = 60$, 25% female) and the HSI. The test-retest correlation for the entire FTND was $r = .882$ ($p < .001$), and the Cronbach's alpha for the items on the FTND was .64. The test-retest correlations for the HSI items were $r = .817$ and $.970$ ($p < .001$). External validity was assessed by measuring the correlation between the FTND and years smoked (associated with increases in intake) $r = .52$ ($p < .001$). Cotinine (a nicotine metabolite that serves as a biological index

of intake) was also found to have a significant correlation with scores on the FTND ($r = .39, p < .05$). Significant correlations were reported for the HSI and alveolar carbon monoxide levels ($r = .25, p = \leq .05$) for 602 American females. Correlations between measures of nicotine dependence and proportions of those quitting smoking were significant for 602 women ($r = -0.18, p = \leq .05$). Following comparative psychometric studies of the FTND and the HSI with 932 persons (602 females), Kozlowski, Porter, Orleans, Pope, and Heatherton (1994) state, "Overall, we found no evidence of greater superiority of the FTND, and therefore, encourage the use of the two-question HSI as a practical, economical substitute" (p. 216).

Hanson (1995) included the FTND in her study of cross-cultural smoking intentions in female adolescents. She reported, "the FTND was found to be a predictor of smoking intention" (p. 177). However, inasmuch as it was highly correlated with attitude and perceived behavioral control, it did not add significantly to the causal model for the prediction of smoking intention. Likewise, Hu and Lanese's (1998) study reported that the independent variable "habit" measured by the FTND was not found to provide a significant contribution to the intention to quit smoking.

Perinatal Variables

In examining variables unique to the postpartum population, Morrow (1995) and Carmichael et al. (2000) found that higher parity was related to increased rates of smoking relapse. Mullen (1997) and O'Campo et al. (1992) did not find any significant relationship between parity and smoking status. Quitting smoking later in pregnancy has been associated with higher rates of relapse in the postpartum period

(Fingerhut et al., 1990; Hutchison et al., 1996; Mullen et al., 1997). Breastfeeding has often been shown to be associated with higher rates of smoking abstinence in the postpartum period (Ratner et al., 2000). O'Campo et al. also found that formula feeding (versus breastfeeding) was a significant predictor of early postpartum relapse.

Variables often associated with postpartum smoking relapse empirically supported by the literature include: lower level of formal education, having a partner that smokes, quitting smoking later in pregnancy, formula feeding, and having a higher self-reported level of nicotine dependence. These variables are often labeled as “external” to the Theory of Planned Behavior, and used to test the adequacy or comprehensiveness of the theory’s constructs (also referred to as predictor variables).

The Theory of Planned Behavior

Most theories of human behavior that attempt to understand and explain social behaviors have originated in the field of social psychology (Godin, Valois, & Lepage, 1993). Social psychology theorists posit that beliefs and attitudes mediate intention, and that it is intention that motivates behavior. “Attitudes are typically conceived of as relatively enduring dispositions that exert persuasive influence on a broad range of behaviors” (Ajzen, 1988, p.25). Yet human thoughts and feelings are flexible and attitudes are, therefore, modifiable.

The origins, operational definitions of the theoretical constructs, instrument development and other psychometric properties of the Theory of Planned Behavior, are presented in this section as well as previous studies examining smoking cessation that have used the Theory of Planned Behavior. The Theory of Planned Behavior is an extension of the Theory of Reasoned Action developed by Ajzen and Fishbein

(1980). The variables included in the Theory of Reasoned Action and their interrelationships are depicted in Figure 1. The Theory of Reasoned Action posits two constructs that act as determinants to intention, one personal and one social in nature- attitude and subjective norm respectively. The first construct, attitude, is described as a negative or positive evaluation of performing or not performing a behavior. Subjective norm reflects an individual's perceptions of the social pressures being exerted when others think a given behavior should or should not be performed by the person.

Figure 1. Theory of Reasoned Action.

An individual's volitional control over the behavior in question is requisite to the Theory of Reasoned Action (Ajzen & Fishbein, 1980; Godin et al., 1993). Yet, frequently individuals do not have complete control over their behavior. Rather,

adoption of a given behavior is located on a continuum that extends from total control, to a complete lack of control. The Theory of Planned Behavior acknowledges this continuum of control and introduces the construct of perceived behavioral control in addition to attitude and subjective norm in order to address the issue of nonvolitional control over most behaviors (see Figure 2). Perceived behavioral control refers to people's perceptions of the ease or difficulty of performing the behavior of interest (Ajzen, 1991). Performance of a nonvolitional behavior is a joint function of intention and perceived behavioral control, along with attitude and subjective norm. The dotted line from perceived behavioral control to behavior acknowledges that perceived behavioral control can also exert a direct influence on behavior independent of intention. This direct effect represents "non-motivational factors", such as opportunities and resources (e.g., time, money, skills, cooperation of others) (Ajzen, 1991).

Accessible Beliefs

The Theory of Planned Behavior posits that a central core of *modal accessible beliefs* guide all human behaviors. Ajzen (in press) asserts that all behaviors can be traced to a person's accessible beliefs about a behavior. Accessible beliefs (previously referred to as "salient" beliefs) represent the most basic level of the explanation of behavior. Ajzen (1988) states that individuals may have many thoughts about an object, but can reasonably only attend to relatively few, or a maximum of eight or nine accessible beliefs.

There are three types of beliefs in the Theory of Planned Behavior: *behavioral beliefs* that encompass the "likely outcomes of the behavior and the evaluation of

Figure 2. Theory of Planned Behavior.

these outcomes”; *normative beliefs* that capture the expectations of others and the motivations to comply with these others’ expectations; and *control beliefs* that include “factors that may facilitate or impede the performance of a behavior and the perceived power of these factors” (Ajzen, 2001a, p. 1). Notably, Ajzen (2001a) has highlighted the critical importance of the accessible beliefs by adding the behavioral, normative, and control beliefs to his model diagram (see Figure 2). The operational definitions of the constructs of the Theory of Planned Behavior are presented in Table 1.

Ajzen (1988) also asserts that behavioral tendencies can possess various degrees of temporal stability. So when circumstances change, such as during pregnancy and the postnatal period, causal antecedents (i.e., attitudes, social norms, and perceived behavioral control) toward a behavior (e.g., smoking) may precipitate a change in behavior. Moreover, the Theory of Planned Behavior does not assume that people have a need for consistency in their beliefs. Therefore, a person can believe that smoking is bad for their health, yet still smoke cigarettes because of other factors that are more influential such as smoking cigarettes as a way of managing stress. It is the aim of the Theory of Planned Behavior to identify the causal antecedents of a behavior, and, thereby, develop appropriate interventions to modify behavior, (for example, to decrease postpartum smoking relapse rates). Developing an increased repertoire of resources and a sense of increased opportunities must also be a major goal of intervention programs (Ajzen, 1991; Hanson, 1997).

Table 1

Operational Definitions of the Constructs of the Theory of Planned Behavior

Construct	Operational definition
Behavior	An observable response
Actual behavioral control	Degree to which a person possesses the skills, resources, and other prerequisites needed to perform a behavior.
Intention	Plans of action in pursuit of behavioral goal. Immediate antecedent of behavior.
Attitude	Positive or negative evaluation of performing the behavior. Antecedent to intention.
Behavioral beliefs	Pros and cons about the behavior. Antecedent to attitude. Comprised of behavioral belief strength and outcome evaluation of the behavior.
Behavioral belief strength	Reflects amount of subjective weight a person attributes to the importance of performing a behavior.
Outcome evaluation	Subjective cost of performing (or not performing) a behavior.
Subjective norm	Perceived social pressure to engage or not to engage in a behavior. Antecedent to intention.
Normative beliefs	Beliefs about what others think about the behavior. Antecedent to subjective norm. Comprised of normative belief strength and motivation to comply (with others).

table continues

Construct	Operational definition
Normative belief strength	Weight of subjective evaluations of what important others (primary referents) think about the behavior.
Motivation to comply	The amount of importance a person places on the opinions of others about the behavior.
Perceived behavioral control	Perceptions of a person's ability to perform a given behavior. Antecedent to intention. "Often reflects actual behavioral control".
Control beliefs	Beliefs about the presence of factors that may facilitate or impede performance of the behavior. Antecedent to perceived behavioral control. Comprised of control belief strength and control belief power (sometimes referred to as perceived power).
Control belief strength	Relative weight of the contribution of perceived facilitators (resources) and barriers (obstacles) to performing the behavior.
Control belief power	How much control a person believes they possess over the performance of the behavior.

Note. Definitions adapted largely from "Construction of a Standard Questionnaire for the Theory of Planned Behavior," by I. Ajzen, 2001, University of Massachusetts at Amherst.

According to the Theory of Planned Behavior, each of these three identified behavioral constructs (i.e., attitude, subjective norm, and perceived behavioral control) exerts independent influences on the intention to perform the behavior in question (Hillhouse, Adler, Drinnon, & Turrisi, 1997). Behavior is predicted by assessing the strengths of the relationships between the behavioral constructs: attitude, subjective norm, and perceived behavioral control, as well their relationship to intention to engage in a specific behavior. For example, whereas attitude may be a strong determinant of intention to exercise, subjective norm may predominate when examining adolescents' intentions to obtain a driver's license. Furthermore, the proportion of influence exerted by each of the determinants or constructs varies with, not only the behavior in question (e.g., cigarette smoking), but also from one population to another (e.g., elderly versus postnatal women).

Recently, Ajzen (2001a) has introduced "actual behavioral control" as a new theoretical component of his model. Actual behavioral control represents the ideal assessment of the "realistic" resources and opportunities available to a person in relation to the ultimate performance of the behavior. In most cases where persons do not have total control over the behavior, perceived behavioral control "serves as a proxy for actual control and contributes to the prediction of the behavior" as depicted in Figure 1 (Ajzen, 2001a, p. 1). In summary, individuals will tend to perform a behavior when they view it as possessing positive value for themselves, believe that others important to them think they should perform the behavior, and perceive that they have some measure of control over the target behavior (Courneya & McAuley, 1995).

Instrument Development and Pilot-Testing

Instrument development is an integral part of studies using the Theory of Planned Behavior. The tenets of the Theory of Planned Behavior require that each population and behavior being studied have its own specific instrument. In other words, there is no global instrument that can be employed in all studies using the Theory of Planned Behavior.

Godin and Kok (1996) and Ajzen (2001b) outline the steps involved in the development of instruments using the Theory of Planned Behavior as follows:

1. The behavior under study must first be “defined and measured in relation to the four specific elements of *action*, *target*, *context*, and *time*, because a change in one element often redefines the behavior of interest” (Ajzen & Fishbein, 1980; Kretzer & Larson, 1998, p. 247). In this study of postpartum smoking behaviors the four elements were expressed as: remaining abstinent (action) from smoking (target) during the first year (time) following delivery (context).
2. Next, the three belief-based measure scales of attitude, subjective norm, and perceived behavioral control are developed. The following information is obtained from about 25 people from the population of interest in the form of open-ended questionnaires, interviews, or focus groups. The intent is to generate (a) a list of the most frequently perceived advantages and disadvantages of performing the behavior (i.e., behavioral beliefs); (b) a list of important people or groups of people who would approve or disapprove of one’s performance of the behavior (i.e., normative beliefs); (c) and a list of

perceived facilitators or barriers that could impede or facilitate the performance of the behavior (i.e., control beliefs). This process is referred to as an elicitation study, and is discussed below in detail.

3. Content analysis of the information obtained from the elicitation study is performed. Inter-rater reliability analysis is conducted by at least two persons. The top 75% of the behavioral, normative, and control beliefs are used to construct the belief-based items in the pilot version of the questionnaire.
4. The researcher constructs the four direct measure scales of intention, attitude, subjective norm, and perceived behavioral control using established guidelines for the development of question stems and scale anchors (Ajzen, 2001b). In the pilot version, three or more items are tested for each of these scales. Godin and Kok (1996) recommend 30 subjects for the pilot testing of the instrument. The pilot instrument is analyzed for reliability using the test-retest method, usually two weeks apart. Items are deleted based on measures of internal consistency. Rewording of items may also occur at this time.
5. “The final version of the questionnaire is ready to be used in the main study” (Godin & Kok, 1996, p. 97).

Summated rating scales, such as semantic differential and Likert continuous scales using bipolar adjective pairs, are used in Theory of Planned Behavior instruments. Instruments usually include items with a range of five to seven points. To ensure that the selected bipolar adjectives are appropriate for the population under study and the behavior, several sets of evaluative scales should be constructed and evaluated during pilot testing. In an attempt to avoid

response-set tendencies, items are separated and interspersed, and positive and negative response anchors are reversed throughout the instrument (Ajzen, 2001b). However, in studies that include the belief-based measures, Ajzen (personal communication, November 14, 2001) recommends that control belief *power* questions precede control belief *strength* questions to decrease socially desirable responses. Figure 3 illustrates the relationships of the belief-based and direct measure scales related to the theoretical model as previously presented in Figure 2.

Direct measure scales and items.

The goal of the Theory of Planned Behavior is to predict and explain a given behavior by explicating the relative contributions of the constructs of attitude, subjective norm, and perceived behavioral control toward intention. For psychometric procedures, these constructs are labeled the *direct measures scales of attitude, subjective norm, and perceived behavioral control*. Likewise, the accessible belief constructs: behavioral, normative, and control beliefs are referred to as the *belief-based or indirect scale measures of attitude, subjective norm, and perceived behavioral control* (see Figure 3). Following pilot testing, these direct and indirect measures scales are referred to as *predictor variables* when they are used in studies with samples large enough to conduct path analysis procedures. All studies using the Theory of Planned Behavior include the direct measures of intention, attitude, subjective norm, and perceived behavioral control. The direct measures reportedly represent relatively automatic responses (Ajzen, 1991). Direct measure questionnaire items are developed using the “traditional” methods of instrument development based

Figure 3. The seven direct and indirect measures scales of the Postpartum Smoking Questionnaire (PPSQ)

on personal expertise, conferring with subject-matter experts, and reviewing the relevant literature. General templates for the theoretically sufficient wording of instrument items are provided (Ajzen, 2001b).

Intention.

In the Theory of Planned Behavior, intentions are assumed to capture the motivational factors that influence behavior and are indicators of how hard people are willing to try to achieve a behavioral goal (e.g., remain abstinent from smoking) (Norman et al., 1999). Intention represents the degree of effort a person is willing to exert, and is not based on accessible beliefs. Therefore, there is no belief-based/indirect measure of intention. The other direct measures (i.e., attitude, subjective norm, and perceived behavioral control) are said to be affective in nature, which means that they are formed from a set of accessible beliefs (Ajzen, 1988). Items that measure intention often contain stems that include, “I intend to, I will try to, and I plan to” remain abstinent from smoking after having a baby (Ajzen, 2001b). The theoretical antecedents to intention are attitude, subjective norm and, at times, perceived behavioral control.

Attitude.

Attitude focuses on the individual’s evaluation as to whether performing a given behavior is viewed positively or negatively (Courneya & McAuley, 1995). Attitude represents a woman’s perception of the advantages and disadvantages of remaining smoke-free in the postpartum period. It is well known that smoking is often used to control stress (Baer & Lichtenstein, 1988; Cohen & Lichtenstein, 1990; Graham, 1987; Kowalski, 1997; Wewers, 1988; Wynd, 1992). Do postpartum

women employ smoking as a means of stress reduction, of achieving weight control, as a means of combating sleep deprivation, and/or as a self-reward mechanism? Is smoking viewed by postpartum women as more helpful or more harmful? Do the benefits of smoking outweigh the risks? Are women aware of the health and safety risks to themselves and to their children after pregnancy? Do women associate smoking with good times? In other words, do they possess feelings of nostalgia toward cigarette smoking?

Attitude toward a behavior is defined “as a person’s *overall evaluation* of performing the behavior in question” (Ajzen, 2001b, p. 4). Overall evaluation has two distinct components, one is *instrumental* in nature, and is measured by adjective pairs such as *valuable-worthless*, and *harmful-beneficial*. The second type of overall evaluation of attitude is *experiential* and is reflected in bipolar adjectives such as *pleasant-unpleasant*, and *enjoyable-unenjoyable*. Ajzen (2001b) also recommends using an item with *good-bad* anchors as a means of comprehensively capturing a measure of overall evaluation.

Subjective norm.

Subjective norm accounts for the influences of social pressures upon performing or not performing an identified behavior. As reported, partner smoking status is known to exert a strong influence in smoking relapse. Smoking networks or social smoking networks outside the home, such as at workplaces, have also been shown to play a significant role in relapse to smoking (Gibbons & Eggleston, 1996; Murray et al., 1997). Subjective norm is characterized by an evaluation of one’s social norms, that is, a woman’s perception of how her smoking behavior is positively

or negatively accepted by others within her social environment. That is, the higher the level of social support for a behavior (maintenance of non-smoking status), the more likely the individual is to be successful in their smoking cessation efforts (Courneya & McAuley, 1995).

Does the degree of approval or disapproval of smoking expressed following delivery by a woman's significant others' (e.g., partner, friends, co-workers, health care provider) exert any influence on her intentions to remain smoke-free? If so, how much do others' opinions motivate her to comply with their wishes (i.e., to change her behavior)?

Originally, Ajzen and Fishbein (1980) advocated the use of only one subjective norm direct measure item to measure perceived social pressure to perform or not perform a given behavior. But recently, Ajzen (2001b) has revised this recommendation and now advises including several questions that address subjective norm. Items with an *injunctive* quality assess whether a person thinks important social referents believe that the behavior should or should not be performed. Injunctive items have been shown to demonstrate low variability. Issues of social desirability are thought to mitigate responses to these types of questions. Therefore, it is now recommended that items that address *descriptive* norms also be included in the direct measures scale of subjective norm. Descriptive norm questions ask whether important others engage in the behavior in question themselves, and are easily adapted from the injunctive items.

Perceived behavioral control.

Hanson (1997) refers to perceived behavioral control as a measure of self-

control, or the perceived difficulty or ease of remaining abstinent from smoking (Hill, Boudreau, Amyot, Dery, & Godin, 1997). Moreover, perceived behavioral control is assumed to also reflect past experiences (i.e., previous quit attempts) as well as anticipated barriers and obstacles (i.e., triggers, cues to smoking) (Ajzen, 1988). The perceived level of self-control is directly linked to available coping abilities and skills. Coping abilities and strategies are the most thoroughly examined constructs in smoking relapse literature (Shiffman, Paty, Gnys, Kassel, & Hickcox, 1996). Most smokers report that they continue to smoke and relapse to smoking due to stress as mentioned above (Cohen & Lichtenstein, 1990). Perceptions regarding resources and opportunities to remain abstinent from smoking are the integral components of perceived behavioral control. Do postpartum women feel that this is a stressful period in their lives? Do these stressors influence their return to smoking? Do postpartum women believe that they have the resources and opportunities to remain smoke-free? Besides smoking, what other ways can women use to cope with the physical, emotional, and social stressors, of new motherhood?

The direct measures of perceived behavioral control encompass people's level of confidence that they are capable of performing the behavior. There are two general types of direct measure perceived behavioral control items. The first type of item is termed "self-efficacy", and addresses the difficulty of performing the behavior, or the likelihood that the person possesses the ability to perform the behavior. Adjective pairs such as *easy-difficult*, and *true-false* are examples of self-efficacy items. The second type of perceived behavioral control item is termed *controllability*. These types of items "address people's beliefs that they have control

over the behavior, that its performance is or is not up to them” (Ajzen, 2001b, p.6). Examples include, *agree-disagree*, and *no control-complete control*.

Elicitation study.

As an attitude theory, the Theory of Planned Behavior proposes that people change their behavior because interventions are targeted toward modifying existing beliefs (e.g., “quitting smoking will cause me to gain weight”), or by providing new information that leads to the formation of new beliefs (e.g., “most people are back to their baseline weight about six months after quitting smoking”). In order to determine the best approach, the estimated relative weights of the predictor variables (i.e., the behavioral, normative, and control beliefs) of the target population are calculated. Therefore, in studies with a goal of designing behavioral interventions, the belief-based measures, along with the direct measures, must also be included in the final instrument. The belief-based measures represent the modal accessible beliefs of the population of interest and evoke relatively reasoned responses, as opposed to the automatic responses inherent in the direct measures (Ajzen, 2001b).

The modal accessible beliefs are elicited directly from a sample representative of the target study population and are used to construct an instrument’s belief-based items. Accessible beliefs are obtained by conducting an “elicitation study” during the pilot-testing phase of a study (Ajzen & Fishbein, in press; Higgins, 1996). The inclusion of the belief-based items (i.e., behavioral, normative, and control beliefs) in a questionnaire also results in a higher degree of content validity. Various methods can be employed in conducting elicitation studies. Blue (1995) used free-response written formats in obtaining modal belief sets related to exercise behaviors, while

Jennings-Dozier (1999) conducted focus groups in her study of African-American and Latina women's intentions to obtain pap smears. Janke (1994) and Michaels and Kugler (1998) used personal interviews in studies of breastfeeding attrition and exercise in older adults respectively. Hanson (1997) utilized combinations of focus groups and interviews in her development of the indirect belief-based scale items in her cross-cultural study of adolescent smoking.

The elicitation study questions are usually obtained from 20 to 30 persons who are members of the population of interest. The questions ask participants to:

1. List the most frequently perceived advantages and disadvantages of performing the behavior (belief-based/indirect measure of attitude).
2. List the most important individuals or groups of people who would approve or disapprove of one's performance of the behavior (belief-based/indirect measure of subjective norm).
3. List the perceived barriers and facilitating factors that could hinder or facilitate adoption of the behavior being studied (belief-based/indirect measure of perceived behavioral control).

Next, manifest content analysis methods are used to analyze the elicitation study data to identify the accessible behavioral, normative, and control beliefs as outlined in the preceding list (Krippendorff, 1980; Weber, 1990). The elicitation study questions (e.g., interview questions) as outlined above form the categories into which modal accessible beliefs (i.e., codes) are placed. The codes (i.e., beliefs) as identified by one researcher are then subjected to interrater reliability procedures. Ajzen and Fishbein (1980) state that 75% of the beliefs most often stated are retained

for use in the first draft of the questionnaire. These retained beliefs are termed the “modal belief sets”. There is no requirement to have equal numbers of items for each type of belief-based category.

Belief-based measures scales and items.

The *belief-based* constructs are viewed as the antecedents or indirect measures of attitude, subjective norm, and perceived behavioral control respectively. Inclusion of the belief-based measures increases the complexity of instrument development because an elicitation study is required and paired items (i.e., two questions) must be developed to assess behavioral, normative, and control beliefs. Each modal belief obtained during the elicitation study is quantitatively assessed by constructing an individual belief strength and a corresponding outcome evaluation item (behavioral belief); a normative belief strength item and a motivation to comply with others item (normative belief); and a control belief strength item and a corresponding control belief power item (control belief). The wording and structure of the stem questions and the adjective pairs used is theoretically dictated (e.g., what constitutes a normative belief strength versus motivation to comply item), and questionnaire items are developed using suggested, established guidelines (Ajzen, 2001b). Finally, each of the corresponding item pair scores are multiplied and the sum of all the products comprise each of the *belief-based scales of attitude, subjective norm, and perceived behavioral control*.

Behavioral beliefs are the antecedents of attitude. Ajzen (2001b) states that behavioral beliefs are said to capture “information about the attitudinal considerations that guide people’s decisions to engage or not engage in the behavior” (p. 8).

Behavioral beliefs are the product of beliefs about the outcomes of engaging in a particular behavior (i.e., belief strength), and the evaluation of the positive and negative consequences of engaging in the behavior (i.e., outcome evaluation). For example, the score on the belief strength item: “If I smoke cigarettes after having a baby, it will give me a break from taking care of my baby, *Extremely untrue-extremely true*” is multiplied by a person’s response to the corresponding outcome evaluation item: “Getting a break from my baby is *very important-not important at all*”. The products of all of the belief strength and outcome evaluation item pairs are summed to provide a total score for the belief-based/indirect measures scale of attitude.

Figure 4 depicts the process of developing the belief-based/indirect measures scale of attitude (i.e., based on behavioral beliefs). The same process is used for the development of belief-based/indirect measures scales of subjective norm (i.e., encompassing normative beliefs) and perceived behavioral control (i.e., control beliefs) described below.

The identification of modal, primary referents (i.e., most frequently mentioned persons or groups) related to the performance of the behavior occurs during the elicitation study. This information is used to obtain the *normative beliefs*. Approval or disapproval of the primary referents in relation to the behavior being studied is described as *normative belief strength*, and this is multiplied by the corresponding *motivation to comply* with these identified referents item to obtain an individual score. For example, the normative belief strength item, “My father thinks that I *should-should not* smoke after having a baby” is multiplied by its corresponding

Figure 4. *Development of the Belief-Based/Indirect Measures of Attitude Items and Scale*

motivation to comply item: “Generally speaking, how much do you want to do what your father thinks you should do? *Not at all-very much*”. As with behavioral beliefs, all the products of the normative belief items are summed to provide a total scale score for the variable.

The belief-based measures of perceived behavioral control, termed the accessible *control beliefs*, are obtained during the elicitation study. Control beliefs encompass the “accessible factors that may facilitate or impede performance of the behavior” (Ajzen, 2001b, p. 11). The two companion questions that comprise a control belief outcome measure consist of *control belief strength* and *control belief power*. Control belief strength measures the “perceived likelihood (or frequency) of a given control factor being present”. Control belief power examines the extent to which the control factor’s presence has the power to facilitate or impede performance of the behavior” (Ajzen, 2001a, p. 4). An example of a control belief strength item is: “I am addicted to cigarettes: *Likely-unlikely*”; and the corresponding control belief power paired item: “Being addicted to cigarettes makes quitting smoking extremely difficult: *Strongly disagree-strongly agree*”. The total scale score, as above, is the sum of all the products of the pairs of control belief questions contained within the instrument.

Validity and reliability testing.

Pilot testing of the population-specific Theory of Planned Behavior instrument with about 30 persons is required to establish validity and reliability of the of the direct measure items and scales. Including only those direct measure scales that demonstrate high internal consistency (e.g., item-total correlations or Cronbach’s

alpha) in the final instrument also reduces the total number of items on the final instrument. The elicitation study and content analysis processes ensure a high level of content validity for the belief-based measures of attitude, subjective norm, and perceived behavioral control. For theoretical reasons internal consistency is not imposed on the belief-based measures scales. Ajzen (2001b) states, “No assumption is made that accessible beliefs are internally consistent” (p. 12). People often hold ambivalent or even contradictory beliefs toward a given behavior. Temporal stability (test-retest) is another measure of reliability testing that is strongly recommended for both the direct and indirect measures. Temporal stability is crucial in prospective studies that seek to predict future behavior (Ajzen, 2001b).

Theory of Planned Behavior and Smoking Cessation

The Theory of Planned Behavior has been used to examine smoking behaviors in various populations. All of the studies reviewed included smoking-specific variables *external* to the Theory of Planned Behavior (e.g., level of nicotine dependence, number of past quit attempts). Godin, Valois, Lepage, and Desharnais (1992) demonstrated that the variables of attitude and perceived behavioral control were significant predictors of smoking behaviors in 136 women four months postpartum. Of note, the researchers also measured the level of habit (i.e., amount smoked) and did not find that this predicted final smoking status. The study found that attitude and perceived benefits of not smoking during pregnancy (postpartum benefits were not addressed in this study), combined with a firm belief that they could remain abstinent during pregnancy, determines a woman’s strong intention not to smoke. Notably, belief-based measures, which reportedly improve the content

validity of the research instrument, were not included in this perinatal study.

Hanson (1995/1997) applied the Theory of Planned Behavior to predict cigarette smoking intentions in three cultural groups of adolescent females ($N = 430$).

Path analysis results demonstrated direct relationships among attitude, subjective norm, perceived behavioral control and smoking intention in African-American teenagers. For Puerto Ricans and non-Hispanic whites, only attitude, perceived behavioral control, and smoking intention demonstrated significant relationships.

The Fagerstrom Test for Nicotine Dependence (FTND) was found to predict intention to smoke. However, Hanson (1995) reported that, since the FTND was highly correlated with attitude and perceived behavioral control, it did not add significantly to the constructs in the Theory of Planned Behavior model she developed.

Norman, Bell, and Conner (1999) assessed the main constructs of the Theory of Planned Behavior in 84 smokers (38 men and 46 women) who attended a health promotion clinic. They also examined levels of perceived susceptibility to seven smoking related health problems. The number of past smoking cessation attempts and the longest quit time in the past five years were also assessed. Regression analyses revealed that intention to quit smoking was primarily predicted by perceived behavioral control and perceived susceptibility. The Theory of Planned Behavior was also found to be predictive of smokers' attempts to quit smoking over the next six months, with behavioral intention, (but not perceived behavioral control) emerging as a significant predictor of the making of an attempt to quit. The Theory of Planned Behavior model did not predict or explain the success of the quit attempt. Yet, the external variable, length of the longest quit attempt in the last five years, was found to

be predictive of smoking cessation. Recommendations from this study call for future interventions focusing on issues of susceptibility and interventions to increase self-control in those trying to quit smoking.

Hu and Lanese (1998) added previous quit attempt, habit (measured as level of nicotine dependence with the FTND), and priority of quitting to the Theory of Planned Behavior model in studying male workers in three Taiwanese factories. The addition of the priority of quitting smoking improved the level of prediction of the model. Although habit, (or nicotine dependence as measured by the FTND) had no predictive effect on intention, past quit attempts did increase the predictive ability of the Theory of Planned Behavior model. This contradicts Ajzen's (1991) earlier argument that past behavior possesses no significant predictive power.

O'Callaghan et al. (1999) used the Theory of Planned Behavior in their study of "attitude-behavior relationships" regarding cigarette use in 225 Australian high school students. Past behavior and current cigarette use were also examined along with selected sociodemographic variables. They found that attitudes toward smoking, past smoking behavior and perceptions of what significant others think they should do were significant predictors of smoking in these adolescents. "Intentions, together with past behavior, predicted their actual behavior" (p. 455).

While the Theory of Planned Behavior provides a useful approach, it may not fully explain nor predict smoking behaviors, including initiation, cessation, and relapse. Therefore, it is essential to include population-specific variables, which are external to the Theory of Planned Behavior (Ajzen, 2001c).

Summary

The postpartum smoking abstinence goals established in Healthy People 2010 have not been met. Based on this review of the literature, previous prenatal and postnatal smoking avoidance interventions (e.g., individual counseling sessions, distribution of educational materials) have been ineffective in reducing rates of postpartum smoking. Moreover, an adequate theoretical framework, which encompasses the variables unique to the postpartum population, has not been reported in the literature. Neglect of women's attitudes and motivations related to smoking in the postpartum period is a significant reason for the failure of these earlier programs.

The Theory of Planned Behavior is a comprehensive theoretical framework that includes a conceptual schema; instrument development guidelines that emphasize content validity; and causal model techniques using path analysis and structural equation models that lead to predictions and explanations of human behaviors. Furthermore, results from the elicitation study that are based on this theoretical model allow for the design of behavioral interventions that focus on changing behavior by modifying accessible beliefs toward the behavior in question.

The Theory of Planned Behavior has been used to investigate numerous health behaviors including exercise (Courneya & McAuley, 1995; Godin et al., 1993; Michels & Kugler, 1998; Nguyen, Potvin, & Otis, 1997), breast self-examination (Young, Lierman, Powell-Cope, G., & Benoliel, 1991), breastfeeding (Duckett et al., 1998; Janke, 1994; Wambach, 1997), tanning practices (Hillhouse et al., 1997), condom use (Sutton, McVey, & Glanz, 1999), and intentions to obtain a pap smear (Jennings-Dozier, 1999). The Theory of Planned Behavior has also been used to

examine smoking behaviors in several populations and provides a holistic approach to the study of postpartum smoking issues. The development of the Postpartum Smoking Questionnaire (PPSQ) will provide the instrument necessary to fill a critical gap in knowledge related to the motivational factors inherent in postpartum smoking behaviors.

Chapter 3

Methodology

This study focused on the development of the Postpartum Smoking Questionnaire (PPSQ), based on the Theory of Planned Behavior. Toward this end, methods employed in the construction of items on the PPSQ occurred in sequential phases and reflected the process outlined by Ajzen and Fishbein (1980), Godin and Kok (1996), and Ajzen (2001b):

- 1. Phase 1: Elicitation interview study.**
- 2. Phase 2: Instrument construction.**
- 3. Phase 3: Pilot testing of PPSQ instrument.**

The Background Data Questionnaire (BDQ) was developed by the researcher and used to collect pertinent sociodemographic and cigarette smoking-related data.

Sample

A nonprobability, purposive sample of currently smoking and nonsmoking postpartum women within one year of delivery was recruited from two military medical treatment facilities in the Southern California region. Both sites provide obstetrical and pediatric services. One site is a medium-sized hospital, which performs approximately 120 deliveries a month. The second facility is a large teaching medical center with over 300 deliveries per month. Women were recruited for participation in all phases of the study from the obstetrical, pediatric, and family practice clinics at these two facilities.

Inclusion criteria for the convenience samples for Phase 1 (35 interviews) and Phase 3 (pilot testing of the PPSQ, $N = 25$) phases of the study were as follows: (a) volunteer adult female over 18, or under 18 and married and thus considered legally an adult, (b) most recent live delivery within the last 12 months, (c) self-reported smoker at the time pregnancy was discovered, (d) able to speak, write, and understand English, and (e) no known cognitive disabilities.

The researcher developed recruitment posters and literature advertising the study. A short newspaper article was written advertising the study, and electronic bulletin board messages were developed for each phase and distributed to each department participating in the study. Additionally, formal presentations were given to the participating clinic staff members in order to garner support and provide information aimed at the recruitment of participants. Presentations of the results from the Phase 1 elicitation study interviews were then given to the staff of participating departments as a way of requesting referrals for the pilot-testing phase of the study. Potential participants were encouraged to contact the researcher via telephone or electronic mail with any questions, and to schedule a personal interview during the elicitation phase of the study. Each clinic site designated a central collection point where potential participants left their name and phone number.

Study Phases and Procedures

The following section outlines the phases that were undertaken in the development of the Postpartum Smoking Questionnaire (PPSQ) based on the guidelines of Ajzen (2001b), Ajzen and Fishbein (1980), Blue (1995), and Godin and Kok (1996). In Phase 1, 35 structured interviews were conducted with postpartum

women. The pilot version of the PPSQ was constructed in Phase 2, and the PPSQ was pilot tested with 25 women in Phase 3 of the study.

Phase 1: Elicitation Study

The belief-based items on the Postpartum Smoking Questionnaire (PPSQ) were obtained in the elicitation phase of the study. The researcher conducted interviews with 35 women who had delivered within the past 12 months and were current and former smokers. The interview questions asked are included in the Elicitation Study Interview Guide in Appendix A. The researcher audiotaped the interviews with the participants' consent (Appendix B). Interviews took place in a private room, either at a clinic site ($n = 7$, 20%), or at the participant's home ($n = 28$, 80%). Participants selected the interview site. Interviews ranged from 30 to 90 minutes with an average length of 45 minutes. The researcher also took field notes following the interview sessions. The interviews were later transcribed verbatim.

Interview questions.

The behavioral beliefs, which were later used to construct the belief-based/indirect measures of attitude, were obtained by the questions: "What do you think are the advantages and disadvantages of smoking after having a baby? The antecedents to subjective norm are termed the normative beliefs. These accessible beliefs regarding important referents were ascertained by asking participants to "List any individuals or groups of people who would approve or disapprove of your smoking after having a baby". Likewise, control beliefs were determined by the questions: "What do you see as factors that might keep you smoking cigarettes after having a baby? (i.e., facilitators to postpartum smoking), and "What do you see as

factors that might stop you from smoking cigarettes after having a baby?” (i.e., barriers to postpartum smoking). Lastly, a broad, open-ended question was included that attempts to elicit accessible beliefs that are unique to the population under study. This information was obtained by asking: “Do you think there is anything special about having a new baby and whether you smoke or not?”

Participants were encouraged to give multiple answers to each question, to insure obtaining the five to nine accessible beliefs said to be held by an individual (Ajzen, 1996; Ajzen & Fishbein, 1980). Audiotapes, written notes, and transcripts were kept in a locked cabinet.

Content analysis.

Taped interviews were transcribed verbatim and analyzed by the researcher using manifest content analysis techniques as described by Krippendorff (1980) and Weber (1990). Content analyses were performed on responses for each specific question in the Elicitation Study Interview Guide (Appendix A) in order to discover the modal behavioral, normative, and control beliefs. The unit of analysis was the complete thought or theme, which could range in length from a single word to a complete thought. This process was conducted until all data were placed into mutually exclusive categories (Weber, 1990). Each of the first six questions on the interview guide represents a separate category.

Next, a certified nurse midwife experienced in postpartum smoking issues was recruited and trained as a research assistant to independently categorize a random sample of 12 of the interviews for the purpose of establishing interrater reliability. The minimally acceptable level of agreement between the researcher and the assistant

was set at 80%. Training was provided to the research assistant, along with a copy of the coding instructions included in Appendix D. Two interviews not included in the final round were coded together in a practice round.

Background data questionnaire (BDQ).

The Background Data Questionnaire (BDQ) (Appendix C) developed by the researcher was used to collect sociodemographic data in order to describe the sample and to perform tests of association of variables referred to previously as “external” to the Theory of Planned Behavior. The questions related to age, ethnicity, parity, level of education, marital/partnered status, and employment status if not on active duty. Military-specific items involved active duty status, military deployment status, and military rank (an estimate of socioeconomic status). Specific postpartum smoking questions included: age when person started smoking, smoking status during most recent pregnancy, timing of quitting during most recent pregnancy (when applicable), current smoking status, timing of return to smoking following delivery, household members’ smoking status, infant feeding method, and level of dependency on nicotine (Heavy Smoking Index). Reading level measurement using the Flesch-Kincaid grade level readability test demonstrated that the BDQ was written at the sixth grade level (Waltz et al., 1991).

Questions 16 and 17 on the Background Data Questionnaire (BDQ) comprise the Heavy Smoking Index (HSI). The two questions on the HSI are: (a) How soon after you wake up do you smoke your first cigarette, and (b) How many cigarettes a day do you smoke? (Heatherton et al., 1991; Kozlowski et al., 1994). Each question is scored from 1 to 4. A higher total score indicates a greater level of nicotine

dependence.

Phase 2: Instrument Construction

The 104-item Postpartum Smoking Questionnaire (PPSQ) (Appendix G) was developed using Ajzen's (2001b) most recent guidelines for construction of a questionnaire using the Theory of Planned Behavior. The conceptual schema of the study is presented in Figure 5.

The PPSQ consists of seven scales, addressing the four direct (intention, attitude, subjective norm, and perceived behavioral control) and the three belief-based/indirect measures scales (attitude, subjective norm, and perceived behavioral control) that assess the constructs of the Theory of Planned Behavior (see Figure 3). Additionally, Ajzen now recommends the inclusion of an observation or, as in this study, a self-report of past behavior. A five-point Likert rating scale between polar adjectives was used for scoring using established Theory of Planned Behavior instrument development guidelines (Ajzen, 2001b; Godin & Kok, 1996). The direct measures and past behavior items were developed solely by the researcher and are presented in Chapter 4. The belief-based items of the PPSQ were developed following the elicitation interview study as discussed below. The Flesch-Kincaid Grade Level score for the pilot version of the PPSQ was 6.3 (Strickland, et al., 1991).

Scales construction.

A five-point Likert rating scale and scoring system (1 to 5) is used on the PPSQ. Higher scores indicate more support for smoking. A unipolar scoring system (+1 to +5) was applied. There are separate scale scores for each of the four direct measures and the three belief-based/indirect measures. A total scale score for each of

Figure 5. Conceptual schema of postpartum smoking study using the Theory of Planned Behavior

the four direct measures scales (e.g., direct measure of attitude) was obtained by summing the scale items for each participant. Direct measure scale variables were computed for time 1 and time 2 (test-retest) forms of the PPSQ.

The modal beliefs, accounting for 75% of all beliefs stated most often within each category (i.e., in response to each interview question) were used to construct the belief-based items of the Postpartum Smoking Questionnaire (PPSQ) according to established guidelines that are discussed in Chapter 4 (Godin & Kok, 1996).

A total scale score for each of the three belief-based (indirect) measures scales was obtained by multiplying the scores for corresponding item pairs and summing the products (see Figure 4). Symbolically, for construction of the belief-based attitude scale the following equation was used:

$$A_B = \sum b_i e_i$$

Where A_B = attitude toward the behavior; b = behavioral belief strength item; and e = outcome evaluation item. For the indirect measure of subjective norm the equation used was:

$$SN = \sum n_i m_i$$

Where SN = subjective norm; n = normative belief strength item; and m = motivation to comply (with others) item. For the indirect measure of perceived behavioral control the equation used was:

$$PBC = \sum c_i p_i$$

PBC = perceived behavioral control; c = control belief strength item; and p = control belief power item.

Phase 3: Pilot-Test of the Postpartum Smoking Questionnaire (PPSQ)

In Phase 3 of the study, participants were asked to complete and return the PPSQ while in the clinic. At the same time, participants were asked to self-address an attached envelope so the second PPSQ could be mailed to them for the test-retest analyses along with the BDQ in approximately two weeks. Some women were referred to the researcher for the study without completing the first questionnaire in the clinic. In these cases, both the initial and retest questionnaires were mailed (two weeks apart) to these women. Also, the researcher attempted to contact women who participated in the elicitation study interview phase to determine if they wanted to complete the PPSQ. When the questionnaires were not returned in two weeks, the researcher sent reminder postcards to the participant. Written notes were taken regarding any feedback related to the questionnaires.

Reliability and validity analyses.

Reliability of the PPSQ was assessed using measures of temporal stability and internal consistency. Temporal stability of each of the seven PPSQ scales was assessed using test-retest reliability techniques in accordance with Ajzen's (2001b) recommendations. Spearman's rank-order (ρ) correlation was used to calculate the test-retest reliability statistics because of the sample size and ordinal nature of the PPSQ items (Pett, 1997). Reliability of the direct measures questions was also assessed using item-to-total score correlations for item analysis (Ajzen, 2001b; Kerlinger & Lee, 2000). Correlation coefficients above .70 were considered acceptable (Polit & Hungler, 1999).

Content validity of the PPSQ was established during the elicitation study

phase using content analysis procedures. Construct validity of the seven direct and belief-based/indirect measure scales of the PPSQ was assessed using Spearman's rho correlation coefficients because of the ordinal nature of the data and sample size to compare the direct and belief measures total scores (Ajzen, 2001b).

Data Analysis Plan

The data analysis plan for this study included the use of descriptive statistics and reliability analyses (e.g., test-retest and item-to-total score correlations). Descriptive statistics, including frequency distributions, measures of central tendency and variability were calculated for each of the PPSQ scales and for items on the BDQ. Data from the interview and pilot study were coded, entered into a computer, and analyzed using the Statistical Package for the Social Sciences (SPSS) program (Stangor, 1999). A second coder verified accuracy of data entry. The data set was cleaned of any wild codes (Polit & Hungler, 1999).

Missing data from the Postpartum Smoking Questionnaire (PPSQ) were coded using mean imputation. The mean value of the missing item was calculated for current smokers and nonsmokers. The appropriate mean value (i.e., smoker versus nonsmoker) for the missing item was then used (Newton & Rudestam, 1999). Missing data in the categories of ethnic background, and deployment status were excluded from statistical analysis. Next, frequency distributions were reviewed to further examine the data set for outliers.

Protection of Human Participants

The study posed minimal risk, and all participants were advised about the benefits and risks to their voluntary participation. The study received approval from

the university and the two military medical treatment facility institutional review boards where data were collected (Appendix E). Written informed consent was obtained from participants agreeing to be interviewed during the elicitation phase of the study as per institutional review board guidelines (Appendix B). All participants' questions were answered during each phase of the study. All participants were advised that their participation in the study was voluntary, and that refusal to participate would not have any effect on their access to health care services. Two participants were provided with tobacco avoidance program information per their requests.

Using identification codes instead of participants' names protected privacy. All documents, including consent forms, paper questionnaires, notes, audiotapes, and interview transcripts relating to an individual's participation in the study were kept in a locked storage file to which only the researcher had access. Computer data files were stored in a password protected computer system.

Chapter 4

Results

The purpose of this study was to develop and test an instrument, the Postpartum Smoking Questionnaire (PPSQ) using the Theory of Planned Behavior as the guiding theoretical framework. Results are presented as they relate to the phases and aims of the study.

Phase 1: Elicitation Study Interviews

During Phase 1, individual, structured interviews were conducted using the Elicitation Study Interview Guide (see Appendix A) in order to elicit the modal behavioral, normative, and control beliefs as specified in the first aim of the study. These modal beliefs were later used to develop the belief-based items on the Postpartum Smoking Questionnaire (PPSQ). Sample characteristics and selected quotations are presented to illustrate some of the modal beliefs obtained from interview transcripts.

Description of the Interview Sample

Sample demographic statistics were collected using the Background Data Questionnaire (BDQ). The age range of the participants was 19 to 37 years, with a mean of 24.4 years ($SD = 4.9$), and a mode of 20 years. The majority of the women reported their ethnicity as white ($n = 27, 77\%$), one person (3%) identified herself as Hispanic, one (3%) listed Pacific Islander, five women (14%) reported “other” as their ethnic background, and one participant (3%) did not report her ethnicity.

The majority of the participants were enlisted active duty members or family members of enlisted members ($n = 33$, 94%). Just over half ($n = 20$, 57%) of the women had one child, nine (26%) had two children, and the remainder ($n = 6$, 17%) had three or four children. Almost two-thirds ($n = 22$, 63%) of the women were stay-at-home mothers. A majority ($n = 20$, 57%) of the participants had at least some college education. The remaining demographic statistics describing the Phase 1 interviewees collected using the BDQ are presented in Table 2.

Selected smoking-specific characteristics are presented in Table 3. The mean age the sample started smoking was 14.9 years ($SD = 2.6$, mode of 13 years). Of the 22 women who quit smoking during pregnancy, 15 (68%) quit during the first trimester. The remainder ($n = 7$, 32%) quit prior to the end of the second trimester. Of the women who returned to smoking, 21 (60%) returned within 2 months after delivery, 1 (3%) returned between 3 and 6 months following delivery, and 2 (6%) relapsed to smoking between 6 and 12 months after delivery. Four (11%) of the current smokers were breastfeeding and five (14%) of the non-smokers were breastfeeding at the time of the interview.

Possible scores on the Heavy Smoking Index (HSI) range from 2-8 points, with a higher score indicating a higher level of nicotine addiction (Kozlowski et al., 1994). The HSI mean for this sample was 4.37, (median and mode = 4.0; $SD = 1.63$). Cronbach's alpha coefficient was used as an estimate of internal consistency for the two items (#16 and 17) on the Heavy Smoking Index ($\alpha = .75$).

Table 2

Phase 1 Interview Participants (N = 35)

Demographics	<i>n</i>	%
Marital status		
Married	33	94
Single	2	6
Active duty status		
Spouse of active duty	29	83
Active duty	5	14
Daughter	1	3
Highest level of education		
Less than high school	5	14
High school	10	29
More than high school	20	57
Employment status		
Stay-at-home parent	22	63
Works outside of home	13	37

Modal Beliefs

The first aim was to: “Elicit behavioral, normative, and perceived behavioral control beliefs about smoking among postpartum women.” The following sections describe the modal behavioral, normative, and control beliefs derived from the interview data. The complete lists of the behavioral, normative, and control beliefs

Table 3

Phase 1 Interview Participants Smoking-Related Variables (N = 35)

Characteristics	<i>n</i>	%
Current smoking status		
Smoking	24	69
Not smoking	11	31
Pregnancy smoking status		
Quit during pregnancy	22	63
Cut down amount smoked	12	34
Smoked the same amount	1	3
Partner's smoking status		
Smoker	18	51
Non-smoker	17	49

obtained from the content analysis procedures are included in Appendix F.

Behavioral beliefs.

Modal behavioral beliefs were obtained by asking participants to identify advantages and disadvantages of smoking after having a baby. Almost half of the women ($n = 15$, 43%) reported no advantages to postpartum smoking as their initial response to this first question. Participants often stated that they felt that this was the socially desirable, or “right answer” to the question. All but one of the participants went on to list advantages after being asked, “Well, what does smoking do for you?”

by the researcher. The number of disadvantages mentioned by participants outnumbered advantages 141 to 108 respectively. The modal behavioral beliefs are listed in Table 4.

Table 4

Modal Behavioral Beliefs: Advantages and Disadvantages of Postpartum Smoking

Advantages (n=108) ^a	Disadvantages (n=141) ^a
Getting a break from baby (17)	Health risks for baby and family (30)
Stress reliever (17)	Makes things smell bad (27)
No advantages (15)	Health risks for self (19)
Relaxing (14)	More inconvenient now (17)
Returning to normal routine (7)	Cost (12)
Self-reward (7)	Having to smoke outdoors (11)
Weight control (7)	Socially taboo (9)

Note. Individual participants could provide multiple answers to each question.

^aIncludes all responses to these two questions.

The most frequently mentioned *advantages of postpartum smoking* related to coping and stress management ($n = 17$): “It probably makes me more likely to smoke just because having a new baby is very stressful.” Getting a break from baby because of not being able to smoke around the infant, smoking as a stress reliever, and viewing smoking as a way of relaxing were also stated as positive attributes of postpartum smoking ($n = 17$): for example, “Time alone, time alone. You say, ‘Honey, I’m going to go outside and have a cigarette.’ You don’t have to deal with either one of them. They get stuck with the baby.” Another young mother said:

It kind of decreases your stress level for you... I've had enough, I want to run away, and you go out there and you smoke a cigarette and you come back and you're all a nice, happy mom. And you can deal with the situation.

Other participants stated: "It's the stress level in my mind. I probably use the excuse that it [smoking] calms me down." and:

My first guilt-free cigarette. This is for me. Everything I do is wrapped up in my husband, my baby, my other kids, my parents. Everything I do is for somebody else. Except for that [smoking]. That is for me. That's what I do for me.

Although the code labels "stress reliever" and "relaxing" appear similar, both the researcher and research assistant coded interviews with separate codes. In the interviews participants did not uniformly express the belief that relaxation was a means to, or a goal of stress relief (by smoking). In other words, women could use smoking to relieve their stress yet not feel relaxed. In fact, many women expressed a need to accomplish more activities and chores that were causing them "stress" by being left undone.

The participants also stated that smoking helped them to return to what they viewed as their "normal routine" ($n = 7$). They associated smoking with their non-pregnant, or "real" self: for example, one woman associated smoking with "Feeling like yourself again. And the old you was a smoker, so the new you is going to be a smoker too. So it's kind of getting back to the old you. It's reconnecting with you."

Cigarettes were also mentioned as a way of rewarding oneself for many things ($n = 7$). For example,

It is a reward after you've paid your dues of nine months of being fit and trying to take care of yourself, doing it for another person, you finally obtain your own body back again, so you can go back to the pleasures you had before. You have to sacrifice a lot [e.g., smoking, good nutrition] to make sure the baby gets here safely. All the sacrifice I did, I finally got to reward myself for producing this perfect little girl.

Abstaining from smoking during pregnancy, as well as completing infant care and household chores, were celebrated by smoking: for example, "I get a little break and I reward myself with it [smoking]. If I finish a chore or I finish a project that I've started, I can go outside and smoke." Weight control was also listed as an advantage to smoking after having a baby ($n = 7$): for example, "Weight loss is the main reason [to smoke after having a baby]."

The most frequently reported *disadvantages associated with postpartum smoking* were the health risks for the newborn and other family members ($n = 30$). One participant stated that "Smoking around the baby could cause health problems for the baby. That's really the only disadvantage that I've thought about." Another recent postpartum quitter stated, "I actually learned in the smoking cessation class... is one of the causes of middle ear infections is second-hand smoke in children."

The bad smell of cigarettes on furniture, clothing, and in cars was the second most frequently mentioned disadvantage of smoking ($n = 27$). Participant's statements in this regard included "It stinks up my house" and, "You tend to smell like smoke so you really don't want to smoke when your baby's awake, but then you want to." Health risks for self were mentioned third most often ($n = 19$); for example,

“Well, I smoke so much I’m going to probably die of cancer if I don’t, I know I will, because I just smoke entirely too much.” Also, statements such as: “The whole health issue. Like my father died of lung cancer. I wouldn’t want him [infant son] to have to watch me die like that. It wasn’t fun to watch him die like that” reflect this sentiment.

The increased inconvenience of smoking after having a baby (e.g., having to address infant’s needs first, washing hands, and changing shirt after smoking) was the fourth most frequently mentioned disadvantage associated with postpartum smoking ($n = 17$), and was reflected in statements such as “Every time that I smoked I had to go wash my hands before I picked up my baby.”

The rising costs of smoking; coupled with the sentiment that money spent on cigarettes could instead be used to buy things for the baby, was mentioned by one third of the women interviewed ($n = 12$); for example, “You think about how much money you’re spending on it and how much that takes away from your baby. Well, if I didn’t have this pack, I could go out and buy her a new outfit.” Nine of the women reported that they realized smoking is considered to be socially taboo, for example, “You look bad in front of other mothers that don’t smoke” and they did not “like being associated with something most people consider dirty and disgusting”.

Normative beliefs.

To assess normative beliefs, participants were asked to list *individuals or groups who would approve and those who would disapprove of their smoking after having a baby*. After the first few interviews it became apparent that the question, “List any individuals and/or groups that would approve of your smoking after having

a baby?” most often resulted in the response, “No one approves of smoking”. This question was subsequently asked as, “List any individuals and/or groups that would approve of, or accept your smoking after having a baby”. This modification in wording was well received during all subsequent interviews. The modal primary referents reported by the participants are listed in Table 5.

Table 5

Modal Normative Beliefs: Referents Who Approve and Disapprove of Postpartum Smoking

Approve (n=52) ^a	Disapprove (n=102) ^a
Fellow smokers (14)	Husband/Partner (19)
Friends who smoke (10)	Mother (17)
Husband/Partner (8)	Father (15)
Mother (6)	Health care providers (14)
	Non-smokers (9)

Note. Individual participants could provide multiple answers to each question.

^aIncludes all responses to these two questions.

Most participants mentioned fellow smokers ($n = 14$) as persons who would approve of or accept postpartum smoking: “I think really the only people that approved of it were other smokers, because they were the only ones who really understood the craving that you have for, I guess, nicotine.” Ten mentioned personal friends who smoke with responses like: “Friends would probably accept it. But my friends, they’re more lenient in a way because they do it, but it’s like misery loves company.” Distinctions were made between the more global, group term, “fellow

smokers”, meaning other smokers the woman may not have even encountered, and personal “friends” who are well known to the woman.

Eight participants mentioned a husband or partner; for example, “He [husband] smokes too.” Another woman stated: “And my husband never, never says a word about it [smoking].” Interestingly, a smoking mother was listed as a source of approval for postnatal smoking by six participants with statements like: “My mother. Because she smokes too.” Several participants mentioned how their parents’ smoking had “consciously and subconsciously” influenced their own decision to begin smoking:

I want to be able to quit [before children are older] because growing up in my household it was... ‘go get my cigarettes out of the truck... out of the nightstand. Go light me a cigarette off the stove’ at seven years old!

In other words, the women did “not want to be responsible for introducing their children to cigarette smoking” because they were smokers.

The number of referents who disapprove of postpartum smoking ($n = 102$) reported by participants was almost twice the number ($n = 52$) of those persons who would accept smoking following delivery. Disapproving referents in descending order included: (1) husband or partner ($n = 19$), for example, husband “disapproved, didn’t like it at all. I kind of quit for him and for me too, cause he didn’t like it either”; (2) mother ($n = 17$); for example, “It would devastate my mother if I started smoking again. She quit after many years, and she was just relieved to have me quit again”; (3) father ($n = 15$) participants, for example, “My dad doesn’t really care, he’s a smoker too”; (4) health care providers ($n = 14$); for example, “I’m sure the entire

medical field. Everybody that know what's wrong with it." This participant went on to say, "Because they [health care providers] know what it does to your health and they actually care." Another woman who had not relapsed to smoking after delivery added: "My husband's a smoker, and they [pediatric health care providers] do a really good job of making him feel as guilty as possible"; and (5) non-smokers ($n = 9$); for example, "You get the non-smokers, the people who had never picked up a cigarette before in their life".

Control beliefs.

The modal control beliefs listed in Table 6 were elicited by asking participants to identify *factors that would keep them smoking and factors that would stop them from smoking after having a baby*. Some of the participants had difficulty responding to these questions as they found these questions similar to the first questions that asked about advantages and disadvantages of postnatal smoking. Addiction to cigarettes was the most commonly mentioned factor that kept postpartum women smoking ($n = 13$). A smoking participant stated:

Full-on addiction. It is a drug. If you crawl inside a smoker's head to when you have to quit, it feels like you are losing a friend. My smoking is probably a full-on addiction and the fear of not being able to quit, so why try?

Several women reported that their level of stress ($n = 12$) was so high, especially after having a baby that they consciously used cigarette smoking as a coping mechanism. This is reflected in statements such as, "I don't know how else I would be able to cope with all this stress [taking care of newborn] if I did not smoke".

Table 6

Modal Control Beliefs: Facilitators and Barriers to Postpartum Smoking

Facilitators (n=122) ^a	Barriers (n=111) ^a
Addiction (13)	Want to live longer (25)
Stress management (12)	Worrying about child's health (23)
Stress of caring for newborn (9)	Wanting to be a positive role model (16)
Boredom (8)	Cost (6)
Need a break from mothering (7)	Responsibilities for new baby (5)
Fear of not being able to quit (7)	Breastfeeding (4)
Military lifestyle stressors (6)	Not wanting children to smell like
Reward for quitting during pregnancy (5)	cigarettes (4)
Habit (5)	Increased social support (4)
Husband/Partner's smoking (5)	Smell of cigarettes (4)
Cravings/urges for cigarettes (5)	
Weight control (5)	
Being around other smokers (5)	

Note. Individual participants could provide multiple answers to each question.

^aIncludes all responses to these two questions.

One participant stated: "You sit there smoking and you don't think about anything else. It's just like any other drug in the world." Specific stress related to infant care was reported as a factor that contributed to postnatal smoking ($n = 9$): "I think my relapse will be stress-related... that's how I started in the first place. It was more like

to ease stress, something you don't have to think about. And having a new baby can be stressful."

Boredom was also an issue as women discussed their isolation in apartments ($n = 8$): "When you're bored, you smoke. Now that I'm not smoking, when I'm bored I eat to replace that whole hand movement, something to do, or whatever."

Other facilitators to postnatal smoking included: needing a break from mothering and fear of not being able to quit smoking ($n = 7$ each), and military lifestyle stressors and norms ($n = 6$). One active duty woman stated: "Everyone in the military smokes. Everyone. Everywhere you go there is cigarette smoking. Everyone lets you bum a cigarette." Five participants each reported viewing postpartum smoking as a reward for quitting during pregnancy, habit, husband's/partner's smoking, cravings for cigarettes, being around other smokers and weight control as being facilitators of postpartum smoking. Examples of responses related to each of these factors are listed below.

For one woman, postpartum smoking was viewed as a reward for quitting smoking during pregnancy: "And it goes back to rewarding yourself for all the efforts you made getting the baby here." Some women expressed the belief that quitting smoking was beyond their control because the habit was "too strong in their life", and by statements such as, "It's just a habit, you know, you can't quit the habit". A husband or partner's smoking did influence women's own smoking behavior. For example, "Or if my husband's going out to smoke I run out there too", and another woman stated: "And also if his father quit, that would be easier on me too. I'm not blaming it on him, but that's part of the reason I started smoking again was because

he smoked.”

Cravings and urges for cigarettes were also mentioned as barriers to refraining from smoking as reflected in statements such as: “And the whole time I was pregnant, I got these urges and stuff. So once I had him, I was thinking, ‘Well, I don’t have him in my stomach anymore, so I can smoke now’”. Issues related to weight control were also cited: “And I’m scared of the weight gain that will happen if I try to quit smoking. I’m terrified of it. So that definitely keeps me smoking”. Being around other smokers also emerged as a barrier to quitting smoking: “The peer pressure thing, too, is awful”. Another woman related the positive aspects of being socially isolated from other smokers when discussing factors that would facilitate her smoking:

Mainly just if I’m around other smokers. That’s what made me start up again after my daughter... I might not now, because I’m not around anybody, but maybe two years down the road, if I’m around somebody... I would probably pick it right back up.

Barriers to smoking after having a baby were not listed as often by the interview participants (111 versus 122 respectively). Wanting to live longer by not smoking cigarettes was the most frequently mentioned obstacle to smoking after becoming a mother ($n = 25$); for example, “The fact that I have kids is more making me want to quit, because if I die of cancer, then who’s going to be their mom? ... That’s more important than anything is to be there for the kids.” Many of these women reported that they knew that smoking would shorten their life expectancy by increasing their risk of developing cancer. They expressed concern about how a

increasing their risk of developing cancer. They expressed concern about how a smoking-related illness would burden their children. Premature morbidity and mortality would prevent them from seeing their “children grow old and have grandchildren”.

Many women felt that the worry and concern they experienced about the potential health problems for their children would lead them to quit smoking eventually ($n = 23$) and expressed this in statements like: “Well, if something serious happens with the baby, if he gets asthma or something. I mean, it’s sad that’s what it’s going to take for me to quit, but that would be the main reason.” Current non-smokers felt that fear about their children’s health being negatively influenced by environmental tobacco smoke (ETS) was helping them to remain abstinent. As one participant stated:

It’s bad for your health, the smell of smoke, you know, being around the baby and the kids, the kids seeing you smoke, so you don’t want them to see you smoke, so the health and having to be around the kids.

Participants often mentioned that they did not want their children to become smokers: “Well, as my kids get older, I want to stop so that they don’t see me [smoking] and therefore they’re not tempted because they don’t see it in their parent.” Sixteen of the mothers expressed that they wanted to be positive role models for their children in statements like: “Your fear of if your baby is going to see you smoking, and if they’re going to pick that up.” and: “I am my daughter’s mentor and also somebody they look up to, so I don’t want to give the idea that you can smoke.” Many of the women believed that their children would eventually view parental

The rising cost of cigarettes was seen as a significant barrier to smoking by more women ($n = 6$) in the postnatal period than before they had a new child. The new responsibilities associated with being a parent, such as breastfeeding, and not wanting children to smell like cigarette smoke, were mentioned by five of the women. Increased social support for being a non-smoker and the smell of cigarettes were mentioned by the smallest number of women ($n = 4$, 11% each) as factors that kept women from smoking after having a baby. For example, one participant stated that: "My husband... the rest of my family... they have already made me feel so conscious about it... that will probably be my stomping ground [instead of smoking friends], my family". Finally, one participant made the following resolution: "Next baby I'm going to stop. I took a chance with him, and he turned out healthy, but the second time is usually not the same charm. I got real lucky with him that he didn't get sick."

The last question asked participants if there was anything special about having a new baby and whether a new mother is a smoker or non-smoker. This question allowed participants to provide information that they had not considered at the beginning of the interview. Responses to this question were incorporated into the appropriate category (e.g., normative belief).

Phase 2: Construction of the Postpartum Smoking Questionnaire (PPSQ)

In Phase 2 the pilot version of the PPSQ was developed in order to address the second aim of the study: "Construct an instrument, the Postpartum Smoking Questionnaire (PPSQ), to measure smoking intentions between smoking and nonsmoking women based on the Theory of Planned Behavior." Summaries of the

scale items and selected examples of instrument items are presented. Table 7 indicates the item numbers that correspond to each scale included in the pilot version of the Postpartum Smoking Questionnaire (PPSQ). The pilot version of the PPSQ instrument is included in Appendix G.

Direct Measure Scales

The three items on the PPSQ direct measure intention scale include the stems “I will try, intend, and plan to smoke or not to smoke in the next month”. Anchors to the questions are: *Definitely true-untrue* (item 21), *Extremely unlikely-likely* (item 22), and *Strongly disagree-agree* (item 53).

The direct measure attitude scale contains three components in five questions. An overall evaluation item is elicited by the adjective pair *good-bad* (item 92), and the instrumental and experiential components are captured by the following anchors: *valuable-worthless* (item 83), *harmful-beneficial* (item 76), *pleasant-unpleasant* (item 97), and *enjoyable-unenjoyable* (item 52) respectively.

There are five direct measure subjective norm items. Four of the items: (#10, 27, 51, and 73) are concerned with important others’ opinions about postpartum smoking. A descriptive norm that asks about the smoking behaviors of important others is also included (item 13) in an attempt to offset social desirability responses as previously discussed.

The direct measure scale of perceived behavioral control consists of four items. Items 11 and 26 were designed to capture the difficulty of performing the behavior. Items 23 and 77 assess controllability, and address whether people believe they have control over their postpartum smoking.

Table 7

Postpartum Smoking Questionnaire Scales and Corresponding Items (N = 104)

Scale	Corresponding item(s)
Direct Measure Scales (4)	
1. Intention (3 items)	21, 22, 53
2. Attitude (5 items)	52, 76, 83, 92, 97
3. Subjective Norm (5 items)	10, 13, 27, 51, 73
4. Perceived Behavioral Control (4 items)	11, 23, 26, 77
Belief-Based/Indirect Measure Scales (3)	
1. Attitude: Behavioral Beliefs	
Behavioral belief strength (b) (13 items)	2, 6, 14, 29, 34, 37, 38, 39, 61, 70, 71, 75, 78
Outcome evaluation (e) (13 items)	4, 5, 8, 9, 16, 36, 42, 43, 60, 62, 64, 68, 72
2. Subjective Norm: Normative Beliefs	
Normative belief strength (n) (7 items)	18, 32, 46, 48, 50, 54, 57
Motivation to comply (m) (7 items)	1, 19, 47, 49, 56, 58, 69
3. Perceived Behavioral Control:	
Control Beliefs	
Control belief strength (c) (23 items)	79-82, 84-91, 93-96, 98-104
Control belief power (p) (23 items)	3, 7, 12, 15, 17, 20, 24, 25, 28, 30, 31, 33, 35, 40, 41, 44, 45, 55, 59, 63, 65-67
Self-Report of Past Behavior (1 item)	
	74

The PPSQ assesses past smoking behavior by asking participants to estimate how often they have smoked at least one cigarette in the last month on a 5-point scale ranging from “never” to “every day”.

Belief-Based Measure Scales

The top 75% modal behavioral, normative, and control beliefs expressed by the elicitation study participants in response to the first six interview questions (each of which represents a category) were used to construct the behavioral, normative, and control belief-based items on the PPSQ.

Interrater reliability was established for the codes developed by the researcher with an overall minimal level of agreement between the researcher and the research assistant of 80%. The interrater reliability was well above this level in each item category. There was an overall level of agreement between the researcher and the research assistant of 93% for all six categories of interview questions. The level of agreement was 96% on interview question 1: “What do you think are the advantages of smoking after having a baby”? For question 2: “What do you think are the advantages of smoking after having a baby?” the level of agreement was 85%. For question 3: “List any individuals or groups of people who would disapprove of (accept) your smoking after having a baby” the level of agreement was 95%. For question 4: “List any individuals or groups of people who would approve of (accept) your smoking after having a baby” the level of agreement was 90%. For Questions 5 and 6: “What do you see as factors that might keep and stop you from smoking after having a baby?” the level of agreement was 96% and 97% respectively.

The *belief-based measure of attitude scale* on the PPSQ contains 26 individual

behavioral belief items (i.e., 13 item pairs). As mentioned above, behavioral beliefs consist of behavioral belief strength and outcome evaluation question pairs. The 13 behavioral belief strength items include: 2, 6, 14, 29, 34, 37, 38, 39, 61, 70, 71, 75, and 78. The 13 corresponding outcome evaluation items to each of the belief strength items are: 72, 36, 9, 16, 42, 8, 68, 5, 4, 60, 43, 62, and 64 respectively. For example, “Smoking cigarettes after having a baby will help me control my weight: *extremely likely-unlikely*” is an example of a behavioral strength item. The paired outcome evaluation item for the preceding belief strength item is: “Controlling my weight is: *not important at all-very important.*”

The *belief-based measure of subjective norm scale* is comprised of the *normative beliefs*. The PPSQ contains seven normative belief strength items: 18, 32, 46, 48, 50, 54, and 57; and seven corresponding motivation to comply items: 47, 58, 56, 69, 49, 19, and 1 for a total of 14 scale items. An example of a normative belief strength item and a corresponding motivation to comply (with others) item is: “Non-smokers think that *I should-should not* smoke cigarettes after having a baby”; and “Generally speaking, how much do you do what non-smokers think you should do? *Not at all-very much*” respectively.

The *belief-based measure of perceived behavioral control scale* contains a total of 46 *control belief* items. Control beliefs consist of control belief strength and control belief power items. The 23 belief strength items are: 79, 80, 81, 82, 84, 85, 86, 87, 88, 89, 90, 91, 93, 94, 95, 96, 98, 99, 100, 101, 102, 103, and 104; and the 23 corresponding control power items are: 44, 41, 25, 66, 45, 31, 59, 40, 30, 28, 67, 12, 33, 35, 63, 20, 3, 24, 7, 17, 55, 15, and 65 respectively. For example, “I am addicted

to cigarettes *likely-unlikely*” and “Being addicted to cigarettes makes quitting smoking extremely difficult *strongly disagree-agree*” comprise one of the control belief strength and power item pairs whose responses were multiplied together.

Phase 3: Pilot Testing of the Postpartum Smoking Questionnaire (PPSQ)

In Phase 3 the PPSQ was pilot tested to achieve the third study aim, “To determine the preliminary feasibility and reliability of the instrument”. The pilot-test sample characteristics and results are presented in the following section.

Description of the Pilot-Test Sample

The same inclusion criteria were used during the pilot-testing phase as were employed during the interview phase of the study. Both current smokers and nonsmokers participated in the pilot-testing phase. Forty-seven first-round PPSQ forms were completed. A total of 25 postpartum women completed both the test and retest forms of the PPSQ for a 53% response rate. Seven women (28%) from the interview phase also participated in the pilot testing of the PPSQ. The sample size of 25 was in keeping with Godin and Kok’s (1996) pilot test sample size guidelines.

Selected demographic characteristics of the Phase 3 sample derived from the Background Data Questionnaire (BDQ) are presented in Table 8. The age range of the participants was 19 to 33 years, with a mean of 24.1 years ($SD = 3.13$), and a mode of 24 years of age. The majority of the women reported their ethnicity as white ($n = 20, 80\%$); three (12%) listed themselves as African-American, one (4%) person listed Asian, and one person (4%) marked Pacific Islander. The majority of participants were either enlisted active duty service members, or were married to an

enlisted member ($n = 22$, 88%). Two-thirds ($n = 16$, 64%) of the women had one child, seven (28%) had two children, and the remainder ($n = 2$, 8%) had three children.

Table 8

Phase 3: Pilot-Test Participants ($N = 25$)

Demographics	<i>n</i>	%
Marital status		
Married	24	96
Single	1	4
Active duty status		
Spouse of active duty	24	96
Active duty	1	4
Highest level of education		
Less than high school	2	8
High school	9	36
More than high school	14	56
Employment status		
Stay-at-home parent	17	68
Outside of home	8	32

Selected smoking-specific characteristics are presented in Table 9. The mean age started smoking was 15.7 years ($SD = 2.6$; mode = 14 years). Of the 16 women who quit smoking during pregnancy, 13 (81%) quit during the first trimester. The

remainder ($n = 3$, 19%) quit prior to the end of the second trimester. Of the 17 women that were smoking postnatally, 15 (88%) returned within 2 months after delivery, and 2 (12%) relapsed to smoking between 6 and 12 months following delivery. Nine (53%) of the 17 current smokers were breastfeeding, and four (50%) of the eight non-smokers were breastfeeding at the time of the interview.

The Heavy Smoking Index scores of the participants in this phase ranged from 2 to 7. The HSI mean score was 3.48 the median was 3 and the mode was 2, and the standard deviation was 1.48 (compared to $M = 4.37$, median = 4, mode = 4, and $SD = 1.63$ in Phase 1). The estimate of internal consistency for the Heavy Smoking Index items (#16 and 17) was .76 (as compared to .75 in Phase 1) for the HSI items.

Table 9

Phase 3: Pilot-Test Participants Smoking-Related Variables (N = 25)

Characteristics	<i>n</i>	%
Current smoking status		
Smoking	17	68
Not smoking	8	32
Pregnancy smoking status		
Quit during pregnancy	16	64
Cut down amount smoked	9	36
Partner's smoking status		
Smoker	11	44
Non-smoker	14	56

Descriptive Statistics and the Postpartum Smoking Questionnaire (PPSQ)

The means, standard deviations, and actual ranges for the direct measures scales of intention, attitude, subjective norm, and perceived behavioral control for current smokers and nonsmokers at Time 1 and Time 2 are presented in Table 10.

Table 10

Means, Standard Deviations, and Actual Ranges for the Direct Measure (DM) Scales of the Postpartum Smoking Questionnaire (PPSQ) (N = 25)

Scale	Time 1			Time 2		
	<i>M</i>	<i>SD</i>	<i>Range</i>	<i>M</i>	<i>SD</i>	<i>Range</i>
DM intention						
Smoking (n = 19)	9.95	4.40	3-15	9.79	4.40	3-15
Not smoking (n = 6)	9.33	5.24	3-12	8.83	4.83	3-12
DM attitude						
Smoking (n = 19)	13.0	5.69	5-25	12.89	5.86	5-25
Not smoking (n = 6)	11.5	6.28	5-20	10.67	5.16	5-16
DM subjective norm						
Smoking (n = 19)	10.58	3.30	5-18	9.89	4.24	5-20
Not smoking (n = 6)	8.50	2.88	5-12	9.50	1.97	8-12
DM perceived behavioral control						
Smoking (n = 19)	10.42	3.96	4-16	10.74	3.54	4-12
Not smoking (n = 6)	9.50	1.97	8-12	9.67	1.97	7-13

Note. DM = Direct measure.

The means, standard deviations, and actual ranges for the belief-based measures scales of intention, attitude, subjective norm, and perceived behavioral control for current smokers and nonsmokers at Time 1 and Time 2 are presented in Table 11.

Table 11

Means, Standard Deviations, and Actual Ranges for the Belief-Based Measure Scales of the Postpartum Smoking Questionnaire (PPSQ) (N = 25)

Scale	Time 1			Time 2		
	<i>M</i>	<i>SD</i>	<i>Range</i>	<i>M</i>	<i>SD</i>	<i>Range</i>
BBM of attitude						
(behavioral beliefs)						
Smoking (n = 19)	88.05	33.58	44-166	84.63	36.97	30-156
Not smoking (n = 6)	75.33	25.37	42-108	86.00	35.85	42-121
BBM of subjective norm						
(normative beliefs)						
Smoking (n = 19)	33.68	15.24	16-64	33.95	12.58	19-62
Not smoking (n = 6)	27.00	4.24	22-32	28.67	4.37	24-36
BBM perceived behavioral control (control beliefs)						
Smoking (n = 19)	237.47	83.29	87-338	227.79	77.36	78-342
Not smoking (n = 6)	161.33	72.76	80-275	173.00	75.74	86-275

Note. BBM = Belief-based measure.

Reliability and Validity Analyses of the PPSQ

Temporal stability of the PPSQ scales, including the belief-based measures, was measured using the test-retest method. Spearman's rank-order (ρ) correlation was used to analyze the ordinal data in the PPSQ. The test-retest reliability coefficients for each scale are presented in Table 12 and range from .74 to .93.

Table 12

Test-Retest Correlation Coefficients for the Postpartum Smoking Questionnaire (PPSQ) Scales

Scale	Test-retest reliability coefficient r_s
Direct measures scale	
Intention	.89
Attitude	.87
Subjective norm	.82
Perceived behavioral control	.74
Belief-based/indirect measures scale	
Attitude: Behavioral beliefs	.87
Subjective norm: Normative beliefs	.83
Perceived behavioral control: Control beliefs	.93

Note. r_s = Spearman's rho correlation coefficient. Acceptable level $r_s \geq .70$. All correlations are significant at the $p < .01$ level.

Preliminary reliability of the PPSQ direct measures items was assessed using item-to-total score correlations to assess internal consistency as recommended by

Ajzen (2001b). Because of the small sample size ($N = 25$), Spearman's (ρ) correlation (r_s) was used for the analyses. Items with a $r_s > .70$ were considered acceptable. The results are presented in Tables 13.

Table 13

Item-to-Total Score Correlations (r_s) for the Four Direct Measure Scales

	Scale items				
	21	22	53		
Direct measure intention	.96**	.97**	.96**		
	Scale items				
	52	76	83	92	97
Direct measure attitude	.84**	.80**	.86**	.90**	.87**
	Scale items				
	10	13	27	51	73
Direct measure subjective norm	.48*	.83**	.72**	.72**	.70**
	Scale items				
	11	23	26	77	
Direct measure perceived behavioral control	.72**	.83**	.67**	.52**	

Note. r_s = Spearman's rho correlation coefficient. Acceptable level $r_s \geq .70$.

* $p < .05$. ** $p < .01$.

The belief-based items on the PPSQ possess a high degree of content validity because they were derived from the elicitation study data. The validity of the PPSQ constructs of attitude, subjective norm, and perceived behavioral control was evaluated by calculating correlation coefficients for the three direct measures and the

corresponding belief-based measures scale. Unlike the reliability analyses, no predetermined cutoff value is stipulated in the validity testing of the theoretical constructs of the Theory of Planned Behavior (Ajzen, 2001b). The results are presented in Table 14.

Table 14

Correlations (r_s) Between the Direct Measures and Belief-Based Measures Total Scores

Direct and belief-based measures scales	Correlation coefficient (r_s)
Attitude	.69**
Subjective norm	.59*
Perceived behavioral control	.98**

Note. r_s = Spearman's rho correlation coefficient.

* $p < .05$. ** $p < .01$.

Chapter 5

Discussion

A summary of the aims and findings in relation to the theoretical framework used in the study, suggestions for further research, and implications for clinical practice are presented in this chapter. The purpose of this study was to develop and test the Postpartum Smoking Questionnaire (PPSQ) applying the Theory of Planned Behavior as the theoretical framework for instrument development.

Based on the literature and the interview data many women view their prenatal and postnatal smoking behaviors quite differently. Several participants related sentiments toward their own smoking as being in “suspension” during the prenatal period as described by Stotts et al. (2000). Specifically, interview participants who had relapsed to smoking postnatally overwhelmingly mentioned that they had not quit for themselves, but rather for “the baby while she was inside me”, but “since she is out [delivered] and is healthy, there is no reason to deny myself the one pleasure I have that is just for me.” Bottorff et al. (2000) labeled this sentiment “never really having quit (relapsing because they did not quit for themselves).”

Until the recent past, nursing interventions focused on correcting deficits in knowledge about the hazards of not engaging in a particular behavior (e.g., smoking), or the value of performing a health behavior (e.g., exercise). Scores of educational materials about the benefits and dangers of various health behaviors were developed and distributed. The research literature documents clearly that reliance on

educational methods alone has not been effective in reducing postpartum smoking. The Theory of Planned Behavior posits that this is because educational materials alone do not address the need to modify beliefs about the behavior.

Elicitation Study Findings

The findings from the Phase 1 elicitation study increase the content validity of the final written questionnaire. Participants rarely expressed that they had any additional information that had not been covered in the structured interview questions in the Elicitation Study Interview Guide. Therefore, it is reasonable to assume that the interview questions were effective in capturing women's accessible behavioral, normative, and control beliefs about postpartum smoking. Identification of the population specific modal accessible beliefs is requisite to designing targeted interventions which change current beliefs that are deemed to be obstacles to making desired behavioral modifications (Ajzen, 2001a).

Behavioral Beliefs

With the exception of two participants, women who were current smokers ($n = 24$) could easily relate advantages of postpartum smoking. An increased stress level and the calming effects of smoking were commonly mentioned factors that contributed to postpartum smoking. Getting a break from the demands of their babies (e.g., crying and not sleeping) was also frequently mentioned. These findings are in concert with those of Graham (1987) who found that low-income women used smoking to control their moods, deal with stress, and control their anger toward their children. Graham refers to this as a way for women to create symbolic and physical space away from their children. In this study, comments such as "smoking is an

excuse to get away from the baby and my husband” and “smoking is something I do just for me and no one else” seem to support these conclusions.

However, smoking participants did not offer many possible alternatives to smoking. Concerns were voiced about quitting smoking and “getting fat,” especially after experiencing pregnancy-related weight gain. Moreover, the women often personified cigarettes as “old friends” that provided a connection to “who they were before they became mothers, before they were so tied down with their babies”. This is similar to Bottorff et al.’s (2000) story line of “nostalgia for one’s former self.”

The disadvantages of smoking, and those who disapprove of smoking outnumbered the positive attributes of postnatal smoking and those who approve of smoking almost two to one. Many women reported that their postpartum smoking behaviors were affected by newfound responsibilities inherent to the mothering role. Many respondents specifically mentioned the tremendous value they attached to “being a good mother”. For most of the women smoking was perceived as something that did not resonate with being a good mother, especially in light of society’s growing disapproval of cigarette smoking. Women voiced that internal tensions increased as they tried to justify the use of smoking as a means to reduce their stress level, including feelings of frustration with their babies, and the awareness that cigarettes also placed their children’s health at risk.

Normative Beliefs

Respondents indicated that smoking by others affected their own smoking behaviors. Interestingly, mothers were listed in the top 75% of significant persons who both approve and disapprove of postpartum smoking (see Table 5). These

results suggest that specifically assessing mothers' smoking status may be warranted in future studies. Some of the women interviewed who were not smoking voiced concerns about their impending return to situations where they would encounter people and places (e.g., returning to college) associated with their preconception smoking. This is similar to Bottorff et al.'s (2000) story line of "being vulnerable to smoking". Women whose partners did smoke unanimously related that they would need to try to quit smoking with their husband/partner to increase the likelihood of successful abstinence.

Cigarette smoking was also reported to be a part of one's social identity and was felt to be a common bond with friends who also smoke. Some women described feelings of being left out and being seen as a "traitor" when they became nonsmokers, or even discussed not smoking with their friends. All of the participants acknowledged the increasing social stigma attached to smoking in the United States. However, women whose social network was largely comprised of fellow smokers, as well as those who expressed a measure of social defiance, related that they smoked more because of the perceived pressures not to smoke.

Control Beliefs

Self-reported addiction to cigarettes was the most commonly mentioned factor that kept postpartum women smoking. Over half of the women ($n = 13$) who were currently smoking reported that their addiction to cigarettes was preventing them from quitting smoking. Yet, no significant difference was found between current smokers and nonsmokers on the Heavy Smoking Index (HSI) measure of nicotine dependence. In fact, according to their HSI scores, the interviewees reported an

overall low to moderate level of nicotine dependence.

Many of the women had considered specific instances that would cause them to quit smoking in the future. One mother said, “If their [her children’s] asthma got worse”; another woman responded, “If she had to go to the hospital and have all those painful things [blood work and lumbar puncture] done to her I would quit smoking”. Health care messages about the dangers of ETS had been accurately received, and maternal guilt about smoking resulted. The women also acknowledged that new motherhood increased their worries about how smoking might adversely affect their own health and longevity. Overwhelmingly, the mothers felt that their children would eventually be socially stigmatized because they had a mother who smoked.

The rising cost of cigarettes was frequently mentioned as a factor that made smoking more difficult after having a baby. Yet many of the women reported that buying cigarettes was “cheaper than hiring a babysitter”. This indicates the immediate, relatively cheap self-reward that cigarettes provided to these young women who were often socially isolated and living in meager circumstances.

Instrument Construction

A great deal was learned in developing the Postpartum Smoking Questionnaire (PPSQ). The manifest content analysis techniques used to analyze the interview data in this study were time-consuming because of the volume of dialogue that had to be analyzed. Coding was facilitated by theoretical guidelines, wherein the categories are formed by the interview questions, and the responses to the questions are analyzed to develop the actual codes. The collapsing of codes (e.g., “increases

risk of SIDS” into “health risks for baby and family”) was accomplished after several rounds of data analysis. Transcripts were reviewed twice prior to the interrater reliability process, and once following review by the research assistant.

Initially, interrater reliability of interview codes was to be calculated using Cohen’s kappa (Bakeman & Gottman, 1997). In the end, this statistical technique was not feasible due to the large number of codes that were generated from the interviews for use on the pilot test instrument (Appendix F). Therefore an overall percentage of agreement was used. Only one round of interrater reliability testing was needed since there was strong support for the reliability in coding the data in this manner.

Ajzen (2001b) advocates the use of up to 20 different *anchor pairs* in pilot instruments. In this study, 16 different anchor pairs were included on the Postpartum Smoking Questionnaire (PPSQ). Hanson (1995) retained all 13 anchor pairs used in the pilot version of the Fishbein/ Ajzen-Hanson Questionnaire in her study of adolescent smoking behaviors. Generally, this detail of pilot study work is not reported in the literature. Norman et al.’s (1999) smoking relapse study used 11 different anchor pairs, which included only the direct measure constructs. Hu and Lanese (1998) and O’Callaghan et al. (1999) included five and nine different anchor pairs respectively. They also only assessed the direct measures in their smoking studies.

The use of so many different anchor pairs may have contributed to the difficulty and the burden participants experienced in completing the PPSQ. Ajzen also recommends dispersing different types of questions and reversing positive and

negative anchors throughout the instrument to decrease response set bias.

Applicability of the instrument to both current non-smokers and smokers was difficult to achieve. Attention to these concerns made construction of the PPSQ time-consuming and tedious. Dr. Ajzen was contacted via electronic mail (personal communication, November 14, 2001) with specific questions about the construction of the belief-based perceived power items. He recommended that control belief *power* questions precede control belief *strength* questions to decrease socially desirable responses. This necessitated the reorganization of the original sequence of items that had been tentatively determined using a table of random numbers.

Pilot Study

Two respondents mentioned response fatigue due to the length of the instrument and complexity of responding to the reversed wording of some of the items. Completing the questionnaire was also cumbersome for participants because of references to both “smoking” and “not smoking”. This was especially problematic for nonsmokers. As a compromise, questions that referred to both “smoking” and “not smoking” were included on the PPSQ. Yet, one non-smoking participant wrote “N/A” to five of the early questions that discussed “my smoking”. These issues may account for the low correlations among the paired items. The combination of items both supporting and not supporting smoking behaviors also made designing the final scoring sheet and computing scale variables extremely difficult and complicated the data entry process. In future versions of the PPSQ, clearer instructions, specifically addressing how nonsmokers are to answer the questions, must be developed.

Future Modifications

Plans for future versions of the PPSQ will include modifications to the wording of items so that reference is made only to the behavioral goal of “not smoking”. Phrasing items in this direction will simplify the coding, scoring and equations requisite to development of each of the seven scales on the PPSQ. Furthermore, all the direct and belief-based measure items within each scale will be grouped together on the instrument. However, to avoid response set bias, all the corresponding outcome evaluation, motivation to comply, and control belief power paired items will be grouped together on the instrument. Likewise, all the behavioral, normative, and control strength items will be located together on the PPSQ. This organization will also facilitate required multiplication of the belief-based item pairs, as well as the summation that is required of all types of scale items. These modifications will also decrease the potential data entry error rate that is inherent in a larger data set. Reversal of the polar adjectives will still be included to further reduce response set bias. Consideration will be also given in the future to the development of two PPSQ formats, one for current smokers and, a second for nonsmokers.

Reliability and Validity Analyses

Reliability and validity testing in Theory of Planned Behavior studies has not been standardized, and the testing methods employed by researchers are often not reported in the literature. Evaluation of the belief-based items and scales is particularly difficult in studies using the Theory of Planned Behavior. Theoretical issues related to the contradictory nature of the accessible beliefs can preclude the use

of standard correlation coefficients. For example, Duckett et al. (1998) did not report any measures of internal consistency (e.g., Cronbach's alpha coefficients) for the direct or belief-based measures of subjective norm. They state, "The scale used to measure referent beliefs was not expected to be internally consistent because any woman might have some referents whom she perceived to be supportive ... and others ... unsupportive" (p. 329). Moreover, statistical parameters for item analysis procedures are rarely reported in the literature for most studies, including those using the Theory of Planned Behavior, making it difficult to compare the psychometric properties of the PPSQ with other instruments developed using this framework. Hanson (1995) apparently retained all items from the pilot version of her instrument, the Fishbein Ajzen Hanson Questionnaire (FAHQ) that were significant beyond the .01 level (i.e., regardless of the r value obtained). Pilot test data from 24 adolescents for the belief-based measure of perceived behavioral control scale on the FAHQ were used to calculate a Cronbach's alpha of .70 for the entire scale. No reference was made to individual item analysis.

Reliability of the entire Postpartum Smoking Questionnaire (PPSQ) was supported using measures of temporal stability and internal consistency. Temporal stability is requisite to any instrument that is used to predict behavior at a later point in time (e.g., relapse to smoking). The temporal stability of the PPSQ was supported by the test-retest reliability techniques used in the study. Each of the seven scales of the PPSQ had acceptable test-retest correlation coefficients above .70 (see Table 12).

Internal consistency of the four direct measure scale items was assessed using item-to-total score correlations (see Table 13) (Ajzen, 2001b). All of the direct

measure intention and attitude scale items had correlation coefficients above .70. One of the subjective norm items (#10) achieved a suboptimal internal consistency correlation. This is surprising given the general nature of the question, “most people who are important to me think that I *should-should not* smoke cigarettes after having a baby” and may reflect general confusion about the structure and wording of this and other items on the PPSQ. Similarly, on the direct measure of perceived behavioral control scale, item 26: “If I wanted to, I could NOT smoke any cigarettes in the next month *strongly agree-disagree*” had a item-to-total score correlation less than .70 ($r_s = .67$), as did item 77: “it is mostly up to me whether I smoke cigarettes in the next month *strongly agree-disagree*” ($r_s = .52$). The apparent straightforward nature of these items raises concerns about the construction (e.g., adjective reversal) of the items. Further pilot work will be needed to thoroughly assess these specific items in light of the planned psychometric changes on the next version of the PPSQ.

Construct validity of the pilot version of the PPSQ was supported by strong to moderate correlation coefficients between the direct and belief measures total scores (Ajzen, 2001b; Polit & Hungler, 1999). The construct of perceived behavioral control was highly supported with a correlation coefficient of .98 ($p < .01$) between the direct and belief-based measure scales. The attitude scales had a correlation of .69 ($p < .01$), and the two subjective norm scales had a lower correlation of .59 ($p < .05$). Despite these marginal correlations, they meet or exceed those reported in other studies such as in Rannie and Craig’s (1997) study of adolescent females’ intention to use condoms ($r_s = .76, .49$, and $.64$ respectively). In Hanson’s (1995) study, the correlation between the direct and belief-based measure scale of subjective norm was

$r = .41$. Retention of all the items was reportedly supported because “all [correlations were] significant beyond the .01 level” (p. 81).

Sample-to-Population Comparisons

In comparing the sociodemographic variables of this study to national statistics, some differences were noted that make this sample somewhat unique. For example, all of the women in both study phases had partners. Partner smoking status is another variable that is strongly associated with smoking in the postpartum period (McBride et al., 1998; Mullen, Richardson, Quinn, & Ershoff, 1997; Ratner, Johnson, Bottorff, Dahinten, & Hall, 2000). In future postpartum smoking studies it would be interesting to include a purposive sample of single, active duty women for comparison with partnered women.

Ethnically, the majority of women were Caucasian ($n = 40$, 76%). Purposive sampling to include a more ethnically diverse sample is warranted in future studies to determine if different explanatory models of postpartum smoking exist as Hanson (1997) found in her study of white, African-American and Puerto Rican adolescent females. Interestingly, just over half of the participants had more than a high school education, and six (11%) were not high school graduates. This seems to contradict much of the literature previously reviewed, which states that a lower level of education is consistently associated with cigarette smoking, especially among white women (Fingerhut et al., 1990).

Almost two-thirds (62%) of the women reported that they quit smoking during pregnancy. Yet a pregnancy smoking rate of 38% is higher than the 24.8% reported in the U. S. general population of pregnant women aged 15-25 years (NHSDA, 2001).

Anecdotally, several women related to the researcher that they had not been truthful with their prenatal health care provider about their smoking status, so the result in this study may actually be more accurate than the national study. Of the women who reported that they quit smoking during pregnancy, 25 (76%) quit before the end of the first trimester, which is consistent with the literature reviewed (Mullen et al., 1995). As Ratner et al. (1999) state: "Smoking relapse prevention in the postpartum period may be one of the most effective interventions in ensuring that women who stop smoking for pregnancy remain stopped" (p. 76). Conversely, in this sample only one of the current nonsmokers smoked during pregnancy. Nineteen of the current smokers smoked during pregnancy. Women who had not been motivated to quit smoking during pregnancy did not find the risks associated with postpartum smoking (e.g., ETS health problems) to outweigh the benefits they derived from using cigarettes (e.g., stress, anger, and/or boredom management).

Eleven (58%) of the 19 women who were breastfeeding were smokers. This finding also contradicts the previous literature cited (O'Campo et al. 1992, & Ratner et al., 1999). Several of the smokers who were breastfeeding mentioned education they had received from Women, Infants, and Children (WIC) program counselors who had told them that smoking and breastfeeding were preferable to smoking and bottle feeding. This may reflect a successful program targeted toward increasing breastfeeding in postpartum smokers. Previous studies have examined the effect of efforts to increasing breastfeeding as a way of decreasing postpartum return to smoking. In this study, women breastfed, yet they also continued to smoke. Therefore, this finding does not seem to support the inverse relationship between

smoking and breastfeeding as previously suggested in the literature (Ratner et al., 1999).

Level of addiction was measured in this study using the Heavy Smoking Index (HSI). Scores on the HSI range from 2 to 8, with a higher score indicating a higher level of nicotine addiction. The mean ($SD = 1.66$) and median for the study sample were 4.0, and the mode was 2.0. These results indicate a low level of addiction to nicotine. No association was found between HSI score and current smoking status. A low level of addiction would seem to indicate that nicotine replacement modalities (e.g., nicotine patches) might not be efficacious in this population. However, during the interview phase current smokers did relate that they felt that nicotine replacement would be helpful. This raises several questions and issues in this population of smokers. Is there a strong psychological component to postpartum women's experience of nicotine addiction? Is the HSI an adequate measure of nicotine addiction in this population? Is there a significant placebo effect with the use of nicotine replacement therapies (NRT)?

Methodological Issues and Study Limitations

Social desirability must always be considered in smoking studies. Nondisclosure of smoking during pregnancy became an issue in this study. The small sample size, especially the small number ($n = 6$) of nonsmokers in the pilot testing phase, must be highlighted. Furthermore, generalizing the findings from this study to other populations, especially non-military populations, is inadvisable at this point in time.

Recruitment

During the interview phase clinic personnel were asked to provide the researcher with the names of potential participants. This was accomplished by having the prospective interviewee fill out a flyer with her name and phone number. Identification of potential participants was most frequently done by professional level staff (i.e., registered nurses, tobacco avoidance counselor, and physicians) during the interview phase. Recruitment for the pilot testing phase of the study proved to be more difficult than expected. The test-retest logistics required clinic support staff to ask women about eligibility, distribute the PPSQ, and instruct participants on self-addressing a return envelope to themselves for the retest phase of the study. Recruitment was slow during this phase, and visits were made twice a week to each participating site in order to encourage interest in the study.

Recruiting women for the study who had quit smoking during pregnancy and had not relapsed after delivery was more difficult than anticipated. Many women revealed that they had not really quit smoking during pregnancy and had never disclosed that they had continued to smoke prenatally to their health care provider. Future studies will attempt to purposively recruit postnatal non-relapsers. This might be achieved by contacting tobacco avoidance counselors for referrals of women who attended formal pregnancy smoking cessation programs.

Biochemical Verification

Another potential limitation of the study is that current smoking status was ascertained by self-report rather than by employing biochemical verification. The absence of biochemical testing is congruent with previous studies that have examined

smoking behaviors using the Theory of Planned Behavior (Godin, Valois, Lepage, & Desharnais, 1992; Hanson, 1995; Norman et al., 1999; O'Callaghan, Callan, & Baglioni, 1999). Yet, the lack of biochemical verification is controversial in smoking cessation and relapse studies. In Wall et al.'s (1995) large study of 2,901 mothers receiving smoking cessation and relapse prevention interventions, no biochemical verification was used and this was presented as a potential criticism of the study. Yet the researchers felt such testing might preclude many women from participating in the study. Hutchison et al. (1996) present the lack of confirmatory testing of smoking status as a limitation of their descriptive study regarding women's intentions to quit smoking during pregnancy. They state that self-reported data regarding current smoking status "may be biased due to the influence of social desirability" (p. 315). The less socially acceptable a behavior, such as cigarette smoking, is the less accurate are self-reports of that behavior (Hatziaudeau et al., 1989).

Conversely, there are strong reasons not to include biochemical verification in a research study. Certainly the cost of such testing must be considered, and may be an insurmountable obstacle in a small clinical study. In addition, it is postulated that requiring biochemical testing may dissuade some women from participating in a study due to perceived intrusions into their private lives. Such intrusions exist when urine, and especially blood, samples are obtained. A sense of distrust may be felt and concerns that body fluids may be screened for other substances, such as illegal drugs may be a significant concern for some women (Wall et al., 1995), and this could increase a study's dropout rate. Patrick et al. (1994) conclude that self-reports of smoking status are accurate in most studies but, while most studies use urine samples,

these researchers advocate plasma cotinine testing in “intervention studies, in studies with student populations, and in studies using self-administered rather than interviewer-administered questionnaires” (p. 1092). Social desirability is certainly a factor that might have entered into many women’s decisions about whether to participate in the study even though a biochemical measure was not used.

Conclusions

The Theory of Planned Behavior provides a practical theoretical and instrument development framework for studying a myriad of health behaviors, including postpartum smoking. The incorporation of an elicitation study also affords the researcher the opportunity to employ a mixed methods approach to the study of health behaviors (Polit & Hungler, 1999).

In the short term, an elicitation study focusing on postpartum smoking was conducted. The accessible beliefs of a sample of postpartum women in the military health care system were collected and analyzed. The Postpartum Smoking Questionnaire (PPSQ) was developed and preliminary pilot testing of the instrument was completed. Hopefully in the future, the explanatory model developed using the PPSQ will serve to guide the development, implementation, and evaluation of effective, targeted interventions toward reducing postpartum smoking relapse.

Clinical Implications

The human and economic cost of cigarette smoking continues to grow. Despite the well known harmful consequences of cigarette smoking, most women who smoked prior to pregnancy, as well as those who quit or cut down during pregnancy, will resume smoking following delivery. This return to smoking flies in

the face of women's stated intentions to remain smoke-free after delivery. At first glance, postpartum smoking relapse appears to represent a concrete action or "bad habit". Smoking avoidance interventions for women must be considered in the larger context of women's lives to promote permanent abstinence. During the postpartum period, women confront unique developmental, physical, emotional, social, financial, and psychological issues and experiences. Therefore, nursing research needs to discover successful, cost effective measures and interventions with "real world" applicability that will assist women in remaining smoke-free following delivery (Kendrick et al., 1995). Past educational approaches have not addressed postpartum women's accessible, core beliefs about smoking. Questions such as, "What does smoking do for you after having a baby? And, "What are you going to do in the future instead of smoking when you are stressed or bored?" have not been asked. Helping postpartum women develop effective quitting strategies that address accessible beliefs should be tried. Recommendations and related nursing interventions are suggested based on findings from the elicitation study. A summary is presented in Table 15.

Increasing Disclosure of Smoking Status

Based on the interview data, the first clinical step that must be taken is to increase the rate of disclosure of prenatal and postnatal smoking status. Women in the study related experiencing feelings of guilt and shame due to real or perceived responses from health care providers related to their smoking. For some women, these fears precluded them from ever divulging their smoking status to health care providers, including nurses. Moreover, women regretted informing health care

providers that they were smoking because of feeling scolded and demeaned for not being able to quit. Therefore, a neutral environment, which increases opportunities for disclosure, is of paramount importance. Specifically, screening forms should be constructed to allow for maximum disclosure of smoking status. Including responses such as, “trying to quit smoking” and “cutting down number of cigarettes smoked” can significantly increase the number of women identified as smokers (Mullen, Carbonari, Tabak; Glenday, 1991)

During the interviews, health care providers, including nurses, were viewed as helpful if they acknowledged the difficulty associated with quitting smoking, did not have a “judgmental attitude”, and provided specific resources and tools such as nicotine replacement therapy. In contrast, messages that were perceived as “lecturing, judging, and scolding” led to feelings of anger, defiance, and often a refusal to return to that particular health care provider. As one participant said, “They don’t need to try to make me feel guilty, I already do, and I still smoke”.

Regular Contact and Collaboration

Regular contact between nurses and women during the prenatal period and during well baby visits provides ample opportunities for developing individual assessments, and targeted, belief-based interventions that are unique to this population. During the interviews, women reported receiving formal smoking cessation counseling through the WIC program. Coordination and collaboration with other community services such as the WIC program and Smoke Free Families might result in the development of improved interventions directed toward decreasing smoking rates in this population. Unnecessary duplication of services and efforts

Table 15

Summary of Study Recommendations and Suggested Nursing Interventions

Summary of study recommendations	Related suggested nursing interventions
1. Increase rate of disclosure of pre and postnatal smoking status.	(a) Provide neutral environment to increase opportunities for disclosure, and (b) include “trying to quit” and “cutting down number of cigarettes smoked” as choices on screening forms, rather than forced choices of “smoking: yes/no” to increase number of smokers identified.
2. Capitalize on regular contact with women during regularly scheduled prenatal and well-baby visits, and other programs.	(a) Develop belief-based, targeted assessments and interventions as discussed here that are accomplished and reinforced at each visit, and (b) collaborate with community-based programs.
3. Capitalize on prenatal motivation to quit smoking and extend focus to postpartum advantages of staying quit after delivery.	Highlight direct links between maternal smoking and SIDS; respiratory illnesses such as asthma and ear infections; and possible learning disabilities.
4. Capitalize on motivation to be positive role model for child.	Provide specific counseling and materials that parental smoking significantly increases odds of child becoming smoker later in life.

table continues

Summary of study recommendations	Related suggested nursing interventions
5. Recognize that smoking is sometimes consciously used as “a lesser evil”; rather than using illicit drugs, excessive use of alcohol, and/or food.	(a) Assess for presence of any concurrent addictions, and (b) provide referrals as appropriate (e.g., “Twelve-step programs”).
6. Recognize that smoking is often used by women to control stress, including frustrations and anger toward demands of motherhood.	(a) Assess, acknowledge, and address underlying anger and stress management issues, and (b) provide referrals as appropriate (e.g., anger management, budgeting, and parenting classes).
7. Acknowledge role of partner’s smoking when trying to quit smoking or remain abstinent.	Attempt to include partner in interventions to stop smoking or maintenance programs.
8. Make smoking cessation programs and modalities user-friendly.	(a) Consider holding programs near housing areas, (b) provide free childcare, and (c) consider providing NRT following delivery (i.e., at time of hospital discharge).

Note. NRT = nicotine replacement therapy.

would also be avoided with a coordinated approach.

Prenatal Motivation

Efforts to capitalize on the increased motivation to deliver a healthy infant must also emphasize the dramatic postnatal health risks for infants exposed to ETS.

Information related to life-threatening ETS complications such as SIDS and the direct causal links between smoking and serious respiratory illnesses needs to be communicated prior to resumption of smoking following delivery. For those women who have quit smoking during pregnancy, remaining abstinent is easier than relapsing and having to quit again.

Role Modeling

Women in this study wanted to be positive role models for their children, and most of them viewed cigarette smoking as contrary or hypocritical to being a good example. Mothers need to be informed about the strong, substantiated connection between having a parent who smokes and becoming a smoker later in adolescence. Furthermore, mothers need to be informed that even their very young children are receiving visual messages that imprint the normalcy of smoking.

Concurrent Addictions

Assessment for concurrent substance abuse problems (e.g., drugs and food) should also occur in the postnatal population. Appropriate referrals should be made to cognitive-behavioral modification programs (e.g., “twelve-step programs”). Some postpartum women may be recovering drug addicts and/or alcoholics. A few of the women interviewed stated that they viewed their smoking as a “lesser evil” when compared to using drugs and alcohol. They reported that they were making conscious choices to smoke rather than to use other substances that would impair their ability to parent.

Stress Management

In all populations, smoking is most often used as a way to cope with stress and

anger. New motherhood often involves newfound sources of stress and frustration that can escalate into anger. Attention should also be directed toward financial and parenting stressors. Health care providers need to recognize that smoking provides many women with temporary chemical and physical breaks and relief from these stressors. Therefore, nurses need to assess, acknowledge, address, and ensure that appropriate referrals are made for underlying anger and/or stress management issues, which often accompany addictions, including smoking.

Partner Smoking Status

In this study, having a partner who smoked was seen as a significant barrier to being able to quit smoking for the women interviewed. The women reported that they would be unable to quit smoking if their husbands did not try to quit smoking at the same time. Therefore, partner smoking status must also be considered when postpartum smoking is addressed. A “couples intervention” will most likely be better received by women and possibly be more effective in achieving permanent abstinence.

Formal Smoking Cessation Programs

Several of the women interviewed voiced interest in attending smoking cessation programs, and wanted to try using nicotine patches. Some of the women did not know about the free smoking cessation programs and nicotine patch prescriptions available to them in their health care system. The participants also voiced difficulties related to lack of transportation, issues of physical recovery from pregnancy and childbirth, adjusting to breastfeeding, as well as lack of childcare during smoking avoidance classes as barriers to attending formal programs. These

logistical issues need to be addressed and might be addressed by holding classes in military housing areas near childcare facilities which offer free childcare during health care appointments.

Finally, an intervention assessing the effectiveness of providing nicotine patches in the inpatient setting following delivery should be considered. The provision of NRT is a potentially viable intervention in light of rates of nondisclosure of smoking during pregnancy as well as the early return to smoking for those women who did suspend their smoking during pregnancy.

Recommendations for Further Study

Based on these findings, a comparison of the beliefs of prenatal and postnatal smokers seems warranted and might serve to further highlight and explain any pre- and postnatal dissimilarities. If such differences do exist, an increased understanding of the unique determinants of postpartum smoking can result in more specific, timely, and appropriate interventions for women who want to quit or remain abstinent from smoking following delivery. Such a comparison would further justify the need for the development of two forms of the PPSQ, one for current smokers, and a second version for nonsmokers as previously discussed.

Because so many women mentioned stress as a reason for their postnatal smoking, future research with this population should include a reliable and valid measure of postpartum stress. Stress level was not measured in this study. Additionally, in the process of making home visits to conduct interviews, it was noted that social isolation might be increased for women living in the military culture. Social isolation was not addressed in this study. A measure of social isolation should

be considered in future studies with the military population.

Another question that remains unanswered following this study is the role that self-reported “addiction” as the major barrier to quitting smoking plays in postpartum smoking behaviors in light of the low HSI scores. This seems to contradict participants’ expressed beliefs that nicotine replacement therapies (e.g., nicotine patches) would be helpful in combating their nicotine addiction. These findings raise the question of whether the HSI is an adequate measure of nicotine addiction in postpartum women.

The small study sample size ($N = 25$) precluded the calculation of any meaningful inferential parametric statistics between theory constructs (e.g., attitude and current smoking status). A future, larger study, using power analysis techniques is needed to accurately test the adequacy of the Theory of Planned Behavior as it relates to smoking behaviors in postpartum women. The four direct measures scale (intention, attitude, subjective norm, and perceived behavioral control) and the three belief-based/indirect measures scale (of attitude, subjective norm, and perceived behavioral control) scores will be used as the predictor variables for multiple regression calculations in the larger study. In such a study, an explanatory model of postpartum smoking behaviors will be developed, using path analysis or structural equation modeling techniques (Duckett et al., 1998; Polit & Hungler, 1999).

Nevertheless, much of the preliminary information gained from this study may be applicable when considering strategies to decrease postpartum smoking rates. The interview data, in particular, may prove valuable in future. As Libbus (1997) states: “Qualitative findings from the population of interest will enhance the content

validity of future studies and thereby increase the likelihood that the findings are meaningful for the study population” (p.93).

References

- Ajzen, I. (1988). *Attitudes, personality, and behavior*. Chicago: The Dorsey Press.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179-211.
- Ajzen, I. (1996). The social psychology of decision making. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (pp. 297-325). New York: The Guilford Press.
- Ajzen, I. (2001a). *Behavioral interventions based on the theory of planned behavior*. Retrieved November 12, 2001, from University of Massachusetts, Amherst Web site: <http://www-unix.oit.umass.edu/~ajzen/tpb.html>
- Ajzen, I. (2001b). *Construction of a standard questionnaire for the theory of planned behavior*. Retrieved November 12, 2001, from University of Massachusetts, Amherst Web site: <http://www-unix.oit.umass.edu/~ajzen/tpb.html>
- Ajzen, I. (2001c). Nature and operation of attitudes. *Annual Review of Psychology*, 52, 27-58.
- Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice-Hall.
- Ajzen, I., & Fishbein, M. (in press). Attitudes and the attitude-behavior relation: Reasoned and automatic processes. In W. Stroebe & M. Hewstone (Eds.), *European Review of Social Psychology*. New York: Wiley and Sons.
- Baer, J. S., & Lichtenstein, E. (1988). Classification and prediction of smoking relapse episodes: An exploration of individual differences. *Journal of Consulting and Clinical Psychology*, 56, 104-110.

- Bakeman, R., & Gottman, J. M. (1997). *Observing interaction (2nd ed.)*. New York: Cambridge University Press.
- Bennett, P., & Clatworthy, J. (1999). Smoking cessation during pregnancy: Testing a psycho-biological model. *Psychology, Health & Medicine*, 4, 319-326.
- Birenbaum-Carmeli, D. (1995). Maternal smoking during pregnancy: Social, medical, and legal perspectives on the conception of a human being. *Health Care for Women International*, 16, 57-73.
- Carmichael, S. L., Ahluwalia, I. B., & PRAMS Working Group (2000). Correlates of postpartum smoking relapse: Results from the pregnancy risk assessment monitoring system (PRAMS). *American Journal of Preventive Medicine*, 19, 193-196.
- Charlton, A. (1994). Children and passive smoking: a review. *The Journal of Family Practice*, 38, 267-273.
- Cohen, S., & Lichtenstein, E. (1990). Perceived stress, quitting smoking, and smoking relapse. *Health Psychology*, 9, 466-478.
- Courneya, K. S., & McAuley, E. (1995). Cognitive mediators of the social influence-exercise adherence relationship: A test of the theory of planned behavior. *Journal of Behavioral Medicine*, 18, 499-515.
- DiFranza, J. R., & Lew, R. A. (1995). Effect of maternal cigarette smoking on pregnancy complications and sudden infant death syndrome. *Journal of Family Practice*, 40, 385-394.
- DiFranza, J. R., & Lew, R. A. (1996). Morbidity and mortality rates in children associated with the use of tobacco products by other people. *Pediatrics*, 97,

560-568.

Duckett, L., Henly, S., Avery, M., Potter, S., Hills-Bonczyk, S., Hulden, R., & Savik, K. (1998). A theory of planned behavior-based structural model for breast-feeding. *Nursing Research*, 47, 325-336.

Ershoff, D. H., Quinn, V. P., & Mullen, P. D. (1995). Relapse prevention among women who stop smoking early in pregnancy: A randomized clinical trial of a self-help intervention. *American Journal of Preventive Medicine*, 11, 178-184.

Fingerhut, L. A., Kleinman, J. C., & Kendrick, J. S. (1990). Smoking before, during, and after pregnancy. *American Journal of Public Health*, 80, 541-544.

Gantt, C. J. (1998). *An analysis of smoking relapse*. Unpublished manuscript, University of San Diego, CA.

Gibbons, F. X., & Eggleston, T. J. (1996). Smoker networks and the "typical smoker": A prospective analysis of smoking cessation. *Health Psychology*, 15, 469-477.

Godin, G., & Kok, G. (1996). The theory of planned behavior: A review of its applications to health-related behaviors. *American Journal of Health Promotion*, 11(2), 87-98.

Godin, G., Naccache, H., & Fortin, C. (1998). Understanding physicians' intention to use a simple infection control measure: Wearing gloves. *American Journal of Infection Control*, 26, 413-417.

Godin, G., Valois, P., & Lepage, L. (1993). The pattern of influence of perceived behavioral control upon exercising behavior: An application of Ajzen's theory

- of planned behavior. *Journal of Behavioral Medicine*, 16, 81-102.
- Godin, G., Valois, P., Lepage, L., & Desharnais, R. (1992). Predictors of smoking behavior: An application of Ajzen's theory of planned behaviour. *British Journal of Addiction*, 87, 1335-1343.
- Graham, H. (1987). Women's smoking and family health. *Social Science and Medicine*, 25(1), 47-56.
- Gulliver, S. B., Hughes, J. R., Solomon, L. J., & Dey, A. N. (1995). An investigation of self-efficacy, partner support and daily stresses as predictors of relapse to smoking in self-quitters. *Addiction*, 90, 767-772.
- Guyer, B. (1999). Annual summary of vital statistics. *Pediatrics*, 104, 1229-1246.
- Guyer, B., MacDorman, M., Martin, J. A., Peters, K. D., & Strobino, D. M. (1998). Annual summary of vital statistics-1997. *Pediatrics*, 102, 1333-1349.
- Hanson, M. J. (1997). The theory of planned behavior applied to cigarette smoking in African-American, Puerto Rican, and non-Hispanic White teenage females. *Nursing Research*, 46, 155-162.
- Hanson, M. J. S. (1995). *Beliefs, attitudes, subjective norms, perceived behavioral control, and cigarette smoking in white, African-American, and Puerto Rican-American teenage women*. Unpublished doctoral dissertation, University of Pennsylvania.
- Heatherton, T. F., Kozlowski, L. T., Frecker, R. C., & Fagerstrom, K. O. (1991). The Fagerstrom test for nicotine dependence: A revision of the Fagerstrom tolerance questionnaire. *British Journal of Addiction*, 86, 1119-1127.
- Henerson, M. E., Morris, L. L., & Fitz-Gibbon, C. T. (1987). *How to measure*

attitudes. Thousand Oaks: Sage.

- Higgins, E. T. (1996). Knowledge activation: Accessibility, applicability, and salience. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (pp. 133-168). New York: The Guilford Press.
- Hill, A. J., Boudreau, F., Amyot, E., Dery, D., & Godin, G. (1997). Predicting the stages of smoking acquisition according to the theory of planned behavior. *Journal of Adolescent Health, 21*, 107-115.
- Hillhouse, J. J., Adler, C. M., Drinnon, J., & Turrise, R. (1997). Application of Azjen's theory of planned behavior to predict sunbathing, tanning salon use, and sunscreen use and behaviors. *Journal of Behavioral Medicine, 20*, 365-378.
- Hu, S. C., & Lanese, R. R. (1998). The applicability of the theory of planned behavior to the intention to quit smoking across workplaces in southern Taiwan. *Addictive Behaviors, 23*, 225-237.
- Hutchison, K. E., Stevens, V. M., & Collins, F. L., Jr. (1996). Cigarette smoking and the intention to quit among pregnant women. *Journal of Behavioral Medicine, 19*, 307-316.
- Janke, J. R. (1994). Development of the breast-feeding attrition prediction tool. *Nursing Research, 43*, 100-104.
- Jennings-Dozier, K. (1999). Predicting intentions to obtain a pap smear among African-American and Latina women: Testing the theory of planned behavior. *Nursing Research, 48*, 198-205.
- Johnson, J. L., Ratner, P. A., Bottorff, J. L., Hall, W., & Dahinten, S. (2000).

- Preventing smoking relapse in postpartum women. *Nursing Research*, 49, 44-52.
- Kerlinger, F. N., & Lee, H. B. (2000). *Foundations of behavioral research* (4th ed.). Philadelphia: Harcourt.
- Killen, J. D., Fortmann, S. P., Kraemer, H. C., Varady, A. N., Davis, L., & Newman, B. (1996). Interactive effects of depression symptoms, nicotine dependence, and weight change on late smoking relapse. *Journal of Consulting and Clinical Psychology*, 64, 1060-1067.
- Kowalski, S. D. (1997). Self-esteem and self-efficacy as predictors of success in smoking cessation. *Journal of Holistic Nursing*, 17, 569-562.
- Kozlowski, L. T., Porter, C. Q., Orleans, C. T., Pope, M. A., & Heatherton, T. (1994). Predicting smoking cessation with self-reported measures of nicotine dependence: FTQ, FTND, and HSI. *Drug and Alcohol Dependence*, 34, 211-216.
- Kretzer, E. K., & Larson, E. L. (1998). Behavioral interventions to improve infection control practices. *American Journal of Infection Control*, 26, 245-253.
- Krippendorff, K. (1980). *Content analysis: An introduction to its methodology*. Beverly Hills: Sage.
- Libbus, K. K., S. (1997). Contraceptive decision-making in a sample of Jordanian Muslim women: Delineating salient beliefs. *Health Care for Women International*, 18, 85-94.
- McBride, C. M., Curry, S. J., Grothaus, L. C., Nelson, J. C., Lando, H., & Pirie, P. L. (1998). Partner smoking status and pregnant smoker's perceptions of support

- for and likelihood of smoking cessation. *Health Psychology, 17*, 63-69.
- McBride, C. M., & Pirie, C. L. (1990). Postpartum smoking relapse. *Addictive Behaviors, 15*, 165-168.
- McBride, C. M., Pirie, P. L., & Curry, S. J. (1992). Postpartum relapse to smoking: A prospective study. *Health Education Research, 7*, 381-390.
- McGinnis, J. M., & Foege, W. H. (1999). Mortality and morbidity attributable to use of addictive substances in the United States. *Proceedings of the Association of American Physicians, 111*, 109-118.
- Michels, T. C., & Kugler, J. P. (1998). Predicting exercise in older Americans: Using the theory of planned behavior. *Military Medicine, 163*, 524-529.
- Miller, L. S., Zhang, X., Rice, D. P., & Max, W. (1998). State estimates of total medical expenditures attributable to cigarette smoking, 1993. *Public Health Reports, 113*, 447-458.
- Morrow, C. E. (1995). Preventive care in pregnancy. In W. A. Alto (Ed.), *Primary Care* (pp. 755-784). Philadelphia.: W. B. Saunders.
- Mueller, D. J. (1986). *Measuring social attitudes: A handbook for researchers and practitioners*. New York: Teachers College, Columbia University.
- Mullen, P. D., Carbonari, J. P., Tabak, E. R., & Glenday, M. C. (1991). Improving disclosure of smoking by pregnant women. *American Journal of Obstetrics and Gynecology, 165*, 409-413.
- Mullen, P. D., Richardson, M. A., Quinn, V. P., & Ershoff, D. H. (1997). Postpartum return to smoking: Who is at risk and when. *American Journal of Health Promotion, 11*, 323-330.

- Murray, R. P., Voelker, H. T., Rakos, R. F., Nides, M. A., McCutcheon, V. J., & Bjornson, W. (1997). Intervention for relapse to smoking: The lung health study restart programs. *Addictive Behaviors*, 22, 281-286.
- National Household Survey on Drug Abuse (NHSDA). (2001, July 20). *Tobacco and alcohol use among pregnant women 1999*. Office of Applied Studies. Retrieved October 4, 2001, from <http://www.samhsa.gov/hhsurvey.html>
- Newton, R. R., & Rudestam, K. E. (1999). *Your statistical consultant: Answers to your data analysis questions*. Thousand Oaks, CA: Sage.
- Nguyen, M. N., Potvin, L., & Otis, J. (1997). 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*, 22, 233-246.
- Norman, P., Bell, R., & Conner, M. (1999). The theory of planned behavior and smoking cessation. *Health Psychology*, 18, 89-94.
- O'Callaghan, F. V., Callan, V. J., & Baglioni, A. (1999). Cigarette use by adolescents: Attitude-behavior relationships. *Substance Use and Misuse*, 34, 455-468.
- O'Campo, P., Faden, R. R., Brown, H., & Gielen, A. C. (1992). The impact of pregnancy on women's prenatal and postpartum smoking behavior. *American Journal of Preventive Medicine*, 8(1), 8-13.
- Pett, M. A. (1997). *Nonparametric statistics for health care research: Statistics for small samples and unusual distributions*. Thousand Oaks, CA: Sage.
- Polit, D. F., & Hungler, B. P. (1999). *Nursing research: Principles and methods* (6th ed.). Philadelphia: Lippincott.

- Prochaska, J. O., & Velicer, W. F. (1997). The transtheoretical model of health behavior change. *American Journal of Health Promotion, 12*, 38-48.
- Prokhorov, A. V., De Moor, C., Pallonen, U. E., Hudmon, K. S., Koehly, L., & Hu, S. (2000). Validation of the modified Fagerstrom tolerance questionnaire with salivary cotinine among adolescents. *Addictive Behaviors, 25*, 429-433.
- Rannie, K., & Craig, D. M. (1997). Adolescent females' attitudes, subjective norms, perceived behavioral control, and intentions to use latex condoms. *Public Health Nursing, 14*, 51-57.
- Ratner, P. A., Johnson, J. L., Bottorff, J. L. (1999). Smoking relapse and early weaning among postpartum women: Is there an association? *Birth, 26*, 76-82.
- Ratner, P. A., Johnson, J. L., Bottorff, J. L., Dahinten, S., & Hall, W. (2000). Twelve-month follow-up of a smoking relapse prevention intervention for postpartum women. *Addictive Behaviors, 25*, 81-92.
- Scheibmeir, M., & O'Connell, K. A. (1997). In harm's way: Childbearing women and nicotine. *Journal of Obstetric, Gynecologic, and Neonatal Nursing, 26*, 477-484.
- Severson, H. H., Andrews, J. A., Lichtenstein, E., Wall, M., & Zoref, L. (1995). Predictors of smoking during and after pregnancy: A survey of mothers of newborns. *Preventive Medicine, 24*, 23-28.
- Shiffman, S., Paty, J. A., Gnys, M., Kassel, J. A., & Hickcox, M. (1996). First lapses to smoking: Within-subjects analysis of real-time reports. *Journal of Consulting and Clinical Psychology, 64*, 366-379.
- Stangor. (1999). *Statistical package for the social sciences (SPSS)* (Version 10.0) for

windows [Computer software]: Upper Saddle River, NJ: Prentice Hall.

Sutton, S., McVey, D., & Glanz, A. (1999). A comparative test of the theory of reasoned action and the theory of planned behavior in the prediction of condom use intentions in a national sample of English young people. *Health Psychology, 18*, 72-81.

U. S. Department of Health and Human Services (1991). *Healthy people 2000: National health promotion and disease prevention objectives. Full report with commentary*. (DHHS Publication No. (PHS) 91-50212). Washington, DC.

U. S. Department of Health and Human Services (2000). *Healthy people 2010: Understanding and improving health*, U. S. Department of Health and Human Services. Retrieved March 15, 2001, from http://www.health.gov/healthypeople/Document/HTML/Volume2/27Tobacco.htm#_Toc489766224

Wall, M. A., Severson, H. H., Andrews, J. A., Lichtenstein, E., & Zoref, L. (1995). Pediatric office-based smoking intervention: Impact on maternal smoking and relapse. *Pediatrics, 96*, 622-628.

Waltz, C. F., Strickland, O. L., & Lenz, E. R. (1991). *Measurement in nursing research* (2nd ed.). Philadelphia: F. A. Davis.

Wambach, K. A. (1997). Breastfeeding intention and outcome: A test of the theory of planned behavior. *Research in Nursing and Health, 20*, 51-59.

Weber, R. P. (1990). *Basic content analysis* (2nd ed.). Newbury Park, CA: Sage University Press.

- Wewers, M. E. (1988). The role of post cessation factors in tobacco abstinence: Stressful events and coping responses. *Addictive Behaviors, 13*, 297-302.
- Wewers, M. E., & Lenz, E. R. (1987). Relapse among ex-smokers: An example of theory derivation. *Advances in Nursing Science, 9*(2), 44-53.
- Wynd, C. A. (1992). Relaxation imagery used for stress reduction in the prevention of smoking relapse. *Journal of Advanced Nursing, 17*, 294-302.
- Young, H. M., Lierman, L., Powell-Cope, G., K., D., & Benoliel, J. Q. (1991). Operationalizing the theory of planned behavior. *Research in Nursing and Health, 14*, 137-144.

Appendix A
Elicitation Study Interview Guide

Date: _____

Code: _____

“I am attempting to gather some information about how women personally feel about cigarette smoking after having a baby. I would deeply appreciate your responses to these questions. Please answer the questions honestly, and from *your own* point of view. There are no right or wrong answers. Your answers will be kept private and confidential. Your name will not be used, only a code number.”

1. What do you think are the *advantages* of smoking after having a baby?

2. What do you think are the *disadvantages* of smoking after having a baby?

3. Tell me about any individuals or groups of people who would *approve* of your smoking after having a baby.

4. Tell me about any individuals or groups of people who would *disapprove* of your smoking after having a baby.

Appendix B

Informed Consent

NAVAL MEDICAL CENTER

SAN DIEGO, CALIFORNIA 92134-5000

CONSENT BY A SUBJECT FOR VOLUNTARY
PARTICIPATION IN A CLINICAL INVESTIGATION
(RESEARCH) STUDY

1. I, _____, have been asked to voluntarily participate in a research project entitled, **"Development of the Postpartum Smoking Questionnaire (PPSQ)"**, being conducted at the Naval Hospital Camp Pendleton and Naval Training Center clinics by medical researchers from the Nursing Research Department.
2. The purpose of this research project is to:
 - ◆ Develop a questionnaire that can be given to postpartum women about their attitudes toward smoking.
 - ◆ This study will give health professionals information that may explain why some postpartum women return to, or continue smoking.
3. I understand that my participation in this research project will be for a period of about 1-hour and 15 minutes. Later I may be asked to complete a paper questionnaire that will take about 15-20 minutes to complete.
4. The procedures for this project include:
 - ◆ Filling out a form with questions about my background and past or current smoking habits.
 - ◆ Being asked my opinions about cigarette smoking in the postpartum period during an interview.
5. Specifically, I am aware that the experimental part of this research project is the face-to-face audiotaped interview and completion of a questionnaire.
6. A total of 60 subjects are expected to participate in this study.
7. Minimal or no risks or discomforts are anticipated related to my participation in this study. I may possibly feel some emotional discomfort with questions asked

during the interview. These risks are felt to be no greater than the "normal" risks of day-to-day life.

8. I understand that my participation in this research project may not be of direct benefit to me personally. However, the results of this study may help the investigator gain important knowledge about why some women smoke cigarettes in the postpartum period. In the long run, this study will help health care providers assist women who do not want to smoke cigarettes or aid in the future medical evaluation or treatment of other patients who want to quit smoking.

9. I understand that this research study is not designed to treat any medical condition that I may have. Therefore, there are no alternative procedure(s) or course of treatment that would be of benefit to me.

10. In all publications and presentations resulting from this research study, information about me or my participation in this project will be kept in the strictest confidence and will not be released in any form identifiable to me personally. However, I realize that authorized personnel from the Navy Medical Department may have access to my research file in order to verify that my rights have been adequately protected.

11. If I have any questions regarding this research study, I may contact **Lieutenant Commander Gantt at (760) 745-3641**. If I have any questions about my rights as an individual while participating in a research study at the Naval Medical Center, San Diego, I may contact **CDR(sel) Kenneth Earhart, MC, USN, Chairman, Committee for the Protection of Human Subjects at (619) 532-8125**, or **CDR John M. Kelso, MC, USN, Department Head, Clinical Investigation Department at (619) 532-8127**. If I believe that I have been injured as a result of my participation in this research study, I may contact **CDR L. McNees, JAGC, USN, Naval Medical Center, San Diego, Legal Department, at (619) 532-6475**. I may also contact the Chair of the Committee on the Protection of Human Subjects, Dr. Donald McGraw, Provost's Office, University of San Diego, (619) 260-4548.

12. I understand that my participation in this project is entirely voluntary and that my decision not to participate will involve no penalty or loss of benefits to which I am entitled under applicable regulations. If I choose to participate, I am free to ask questions or to withdraw from the study at any time. If I should decide to withdraw from the research project, I will notify **Lieutenant Commander Gantt at (760) 745-3641** to ensure my

timely removal from the study. My withdrawal will involve no prejudice to my future health care or any loss of rights or benefits to which I am otherwise entitled. Any new significant finding developed during the course of this study, which might affect my willingness to continue participation, will be communicated to me.

12B. The investigator may terminate my participation in this study for the following reason: If I fail to follow the study's procedures.

13. I understand that I am making a decision whether or not to participate in the research project above. My signature indicates that I have had the information presented to me, have had the opportunity to ask questions about the research and my participation, and agree to participate in the study. Further, my signature indicates that I have been provided with a copy of this consent document and a copy of a document entitled, "California Experimental Subject's Bill of Rights."

SIGNATURES/DATE SIGNED: PRINTED or TYPED IDENTIFICATION:

Patient / Subject (Date) _____
SSN Name / Status / Sponsor's

Witness (Date) _____
Name / Grade or Rank

Researcher/Investigator(Date) _____
Name / Grade or Rank

Appendix C

Background Data Questionnaire (BDQ)

Date _____

Code _____

Please mark your answer next to each question. There are no right or wrong answers, this is NOT a test! Please be sure to answer *every* question. Thank You.

1. Age..... _____

2. Ethnic Background _____

African American _____

Asian _____

Hispanic _____

Pacific Islander _____

White _____

Other (please describe) _____

3. What is the *total* number of living children that you have given birth to? _____

4. How old were you when you began smoking?..... _____

5. During your most RECENT pregnancy, did you..... _____

Cut down the number of cigarettes you smoked _____

Increase the number of cigarettes you smoked _____

Quit smoking _____

6. If you *QUIT SMOKING* during your most recent pregnancy, how far along were you in your pregnancy when you *stopped*?

LESS than 4 months pregnant _____

Between 4 and 7 months pregnant _____

More than 7 months pregnant _____

7. Are you smoking NOW?.....

Yes _____

No _____

8. If you are smoking NOW, how long after having your most recent baby did you return to smoking?

At the hospital/right after having the baby to 2 months after the baby was born _____

3 to 6 months after the baby was born _____

6 to 12 months after the baby was born _____

9. Are YOU.....

On active duty _____

Not on active duty, but have a paying job _____

Not on active duty, and do NOT have a paying job _____

10. If you are currently married OR have a partner, was he deployed when you
returned to smoking?

No, he was NOT deployed when I returned to smoking _____

Yes, he was deployed when I returned to smoking _____

Does not apply to me, I never quit smoking _____

Does not apply to me, I did not return to smoking after I had my baby _____

11. Are you (if you are on active duty), or your sponsor (if you are not on active
 duty).....

Enlisted _____

Officer _____

12. What type of relationship are you in right now?.....

Living by myself _____

Married _____

Living with a partner (boyfriend) _____

13. Do any of the following people in your life smoke?.....

Husband/Partner _____

Other people you live with (for example friends, roommates, etc.) _____

Parents (even if you do NOT live with them) _____

14. Are you breastfeeding now?.....

Yes _____

I did at first, but I stopped _____

No _____

15. What is your highest level of education?

Did not finish high school _____

High school graduate _____

Some college _____

College graduate _____

Graduate school _____

Please answer the following even if you are *NOT* currently smoking.

16. How soon after you wake up (or woke up) do you (or *DID* you) smoke your

FIRST cigarette?

Within 5 minutes _____

Within 6-30 minutes _____

Within 31-60 minutes _____

After 60 minutes _____

17. How many cigarettes a day do (did) you smoke?

10 or less _____

11-20 _____

21-30 _____

31 or more _____

Appendix D

Content Analysis Coding Instructions

Development of the Postpartum Smoking Questionnaire (PPSQ)

Content Analysis Coding Instructions

You are being asked to conduct a manifest content analysis of 10 (out of 35) transcribed audio taped interviews. The principal investigator has established categories and the codes are based on repeated reviews of the interview transcripts. The categories are stipulated by the theoretical framework, the Theory of Planned Behavior, and reflect the actual interview questions.

The codes are open to revision based upon your review of the 10 selected interviews. The following is provided as background and as instructions for the coding process. Examples of specific codes are also provided.

- Each interview QUESTION = a separate CATEGORY (so there is a total of 6 categories).
- Each category (i.e. interview question) is coded separately.
- Words, phrases, and complete thoughts are used as codes. Codes were developed from words, phrases, and complete thoughts and are intended to be mutually exclusive (Note: later on you will see some redundancy/similarity/repetitiveness of codes in different categories (e.g. stress-related codes).
- Codes are only counted once within a given category (interview question).
Example: interview #35—"stress" and "stressful" only counted as "stress reliever" code one time.

- Attached you will find a list of codes and brief definitions and/or explanations for each code. These are not meant to be exhaustive.
- Every interview does not contain codes in every category.
- Lastly, some of the participants said some very interesting things that are not applicable to the specific focus of this study. Please feel free to highlight these statements/themes if you wish.

I look forward to reviewing your findings with you when you have completed your analysis. I will compare your results with my own and calculate a level of agreement. If the level of agreement is acceptable (.80), the current codes will be retained. If we do not meet an acceptable level, the codes will be revised and another round of analysis will need to occur. As always, I deeply appreciate all your time and strong commitment to my study.

Appendix E
Institutional Review Board Approvals

Memorandum

6500

KCA

MAR 23 2001

From: Chairman, Scientific Review Committee (SRC)
Chairman, Committee for the Protection of Human Subjects
(CPHS)

To: Commander

Via: Deputy Commander

Subj: EXPEDITED REVIEW OF CIP STUDY #S-01-041, "DEVELOPMENT OF
THE POSTPARTUM SMOKING RELAPSE QUESTIONNAIRE (PPSR-Q) "

Ref: (a) NAVMEDCEN SDIEGOINST 6500.4E

1. The subject study was reviewed by members of the respective committees. Per reference (a), local expedited approval of the above protocol is requested effective the date of your endorsement below.

2. Local expedited approval was authorized for the above research project by two members of the SRC on MAR 15 2001. The signature below is provided to reflect the approval by the committee members.

3. The Chairman, CPHS determined that this study is minimal risk and the approved consent form will be included.

BLAKE H. TURNER
CAPT, DC, USN,
Chairman, Scientific
Review Committee

KENNETH C. EARHART
CDR, MC, USN
Chairman, Committee for
the Protection of Human Subjects

Ensuring Scientifically-Sound Research Through Training and Process Improvement

Appendix F

Elicitation Study Interview Content Analysis Tables

Interview Questions: What do you think are the advantages and disadvantages of smoking after having a baby?

Table 1A

Behavioral Beliefs: Advantages and Disadvantages of Postpartum Smoking

Advantages (n=108)	Disadvantages (n=141)
Getting a break from baby (17)	Health risks for baby and family (30)
Stress reliever (17)	Makes things smell bad (27)
No advantages (15)	Health risks for self (19)
Relaxing (14)	More inconvenient now (17)
Returning to normal routine (7)	Cost (12)
Self-reward (7)	Having to smoke outdoors (11)
Weight control (7)	Socially taboo (9)
Can cope better (6)	Gets into breast milk (5)
Helps handle baby care (4)	Decreases physical stamina (4)
Other ^a (14)	Not maintaining prenatal abstinence (4)
	Other ^b (3)

Note. Individual participants could provide multiple answers to each question.

^aIncludes: fights boredom (3), social activity (3), helps to focus/concentrate better (3), keeps you awake (2), enjoyable (1), increases confidence (1), not being with smoking friends (1).

^bIncludes: being nagged by husband about smoking (1), takes time away from baby (1), lots of disadvantages (1).

Interview Questions: Lists any individuals or groups of people who would approve and disapprove of your smoking after having a baby.

Table 1B

Normative Beliefs: Referents Who Approve and Disapprove of Postpartum Smoking

Approve (n=52)	Disapprove (n=102)
Fellow smokers (14)	Husband/Partner (19)
Friends who smoke (10)	Mother (17)
Husband/Partner (8)	Father (15)
Mother (6)	Health care providers (14)
Father (3)	Non-smokers (9)
Sibling (3)	In-laws (6)
Other ^a (8)	Society (in general) (6)
	Medical community (4)
	Older children (3)
	Other ^b (9)

Note. Individual participants could provide multiple answers to each question.

^aIncludes: mother-in-law (2), co-workers (2), no one (2), tobacco companies (2)

^bIncludes: women, infants and children (WIC) program staff (2), church/religious people (2), grandparents (1), siblings (1), ex-smokers (1), upper class communities (1), corporate communities (1)

Interview Questions: What do you see as factors that might keep or stop you from smoking cigarettes after having a baby?

Table 1C

Control Beliefs: Facilitators and Barriers to Postpartum Smoking

Facilitators (n=122)	Barriers (n=111)
Addiction (13)	Want to live longer (25)
Stress level (management) (12)	Worrying about child's health (23)
Stress of caring for newborn (9)	Wanting to be a positive role model (16)
Boredom (8)	Cost (6)
Need a break from baby (mothering) (7)	Responsibilities for new baby (5)
Fear of not being able to quit (7)	Breastfeeding (4)
Military lifestyle (stressors) (6)	Not wanting children to smell like cigarettes (4)
Reward for quitting during pregnancy (5)	Increased social support (4)
Habit (5)	Smell of cigarettes (4)
Husband/Partner's smoking (5)	Guilt about smoking (3)
Cravings/urges (5)	Easier to quit now (sooner rather than later) (3)
Being around other smokers (5)	Smoking cessation class (3)
Weight (loss/control/management) (5)	Other ^b (11)
Social defiance (4)	
Social isolation (4)	
Other ^a (22)	

Note. Individual participants could provide multiple answers to each question.

^aIncludes: keeps hands busy (3), psychological (“mental”) issues (3), unable to quit during pregnancy (3), sleep deprivation (3), getting back to “normal” self after having a baby (3), familiar associations (e.g. coffee and cigarettes), starts day (2), lesser addiction (2), financial stress (2), invincible from smoking dangers (1).

^bIncludes: quitting with husband/partner (2), wanting to quit before children aware mother is smoker (2), staying away from other smokers (2), older child not wanting mother to smoke (2), no opportunity to get cigarettes (1), nicotine replacement (1), husband/partner’s health (1).

Appendix G

POSTPARTUM SMOKING QUESTIONNAIRE (PPSQ)

We would like to know your opinions about smoking after having a baby. On this questionnaire, you are asked to answer questions that use rating scales that use 5 places. Please make a mark (X) in the space that best describes your opinion. There are NO right or wrong answers.

FOR EXAMPLE: If you were asked to rate the "The weather in Los Angeles" on such a scale, and you think that the weather in Los Angeles is extremely good, then you would place your mark this way:

Extremely bad: ____:____:____:____: X Extremely good

If you think that the weather in Los Angeles is neither good nor bad, then you would place your mark this way:

Extremely bad: ____:____: X :____:____ Extremely good

In marking this questionnaire, please remember the following:

1. Place your mark in the middle of a line, NOT on the dots.
 2. Please answer ALL of the questions.
 3. There are NO right or wrong answers.
 4. Please answer each question honestly; we are interested in YOUR personal postpartum smoking behaviors and opinions!
 5. Please Note: the answer choices are purposefully set up in different patterns.
-

1. Generally speaking, how much do you want to do what fellow smokers think you should do?

Not at all: ____:____:____:____:____ Very much

2. Smoking cigarettes after having a baby will help me control my weight:

Extremely likely: ____:____:____:____:____ Extremely unlikely

3. My children's clothes smelling bad makes it:

Much more difficult: ____:____:____:____:____ Much easier for me to smoke at least one (1) cigarette in the next month.

4. Doing something that is socially taboo is:

Extremely bad: ____:____:____:____:____ Extremely good

5. Smoking outdoors is:

Extremely difficult: ____:____:____:____:____ Extremely easy

6. Smoking cigarettes after having a baby costs a lot of money:

Strongly disagree: ____:____:____:____:____ Strongly agree

7. Stress due to the military lifestyle makes it:

Much more difficult: ____:____:____:____:____ Much easier for me to smoke at least one (1) cigarette in the next month.

8. Rewarding myself is:

Very important: ____:____:____:____:____ Not important at all

9. Getting a break away from my baby is:

Very important: ____:____:____:____:____ Not important at all

10. Most people who are important to me think that:

I should: ____:____:____:____:____ I should **NOT** smoke cigarettes in the next

month.

11. For me to smoke at least one (1) cigarette in the next month would be:

Difficult: ____:____:____:____:____ Easy

12. The stress of caring for a new baby makes it:

Much more difficult: ____:____:____:____:____ Much easier for me to **NOT** smoke cigarettes after having a baby.

13. Most people who are important to me smoke at least one (1) cigarette each week:

Completely true: ____:____:____:____:____ Completely **untrue**

14. If I smoke cigarettes after having a baby, it will give me a break from taking care of my baby:

Extremely **untrue**: ____:____:____:____:____ Extremely true

15. The negative health effects of smoking cigarettes makes it:

Much more difficult: ____:____:____:____:____ Much easier for me to **NOT** smoke cigarettes after having a baby.

16. Doing things that help me relax is:

Not important at all: ____:____:____:____:____ Very important

17. Having a strong smoking habit makes quitting:

Much more difficult: ____:____:____:____:____ Much easier for me after having a baby.

18. Non-smokers think that:

I should: ____:____:____:____:____ I should **NOT** smoke cigarettes after having a baby.

19. Generally speaking, how much do you want to do what your husband/partner thinks you should do?

Not at all: ____:____:____:____:____ Very much

20. Breastfeeding makes it:

Much more likely: ____:____:____:____:____ Much less likely that I will **NOT** smoke cigarettes after having a baby.

21. I will try to **NOT** smoke any cigarettes in the next month:

Definitely true: ____:____:____:____:____ Definitely untrue

22. I intend to smoke at least one (1) cigarette in the next month:

Extremely unlikely: ____:____:____:____:____ Extremely likely

23. How much control do you believe you have over smoking cigarettes in the next month:

No control: ____:____:____:____:____ Complete control

24. Needing a break from my baby makes it:

Much more difficult: ____:____:____:____:____ Much easier for me to **NOT** smoke cigarettes after having a baby.

25. Worrying about my baby's health makes it

Much more difficult: ____:____:____:____:____ Much easier for me to **NOT** smoke cigarettes after having a baby.

26. If I wanted to, I could **NOT** smoke any cigarettes in the next month:

Strongly agree: ____:____:____:____:____ Strongly disagree

27. The people in my life whose opinions I value would:

Approve: ____:____:____:____:____ Disapprove of my smoking cigarettes in the next

month.

28. My husband/partner's smoking makes it:

Much more difficult: ____:____:____:____:____ Much easier for me to **NOT** smoke
cigarettes after having a baby

29. If I smoke cigarettes after having a baby, it will help me relax:

Extremely likely: ____:____:____:____:____ Extremely **unlikely**

30. My cravings/urges for cigarettes after having a baby makes it:

Much more difficult: ____:____:____:____:____ Much easier for me to smoke at least
one (1) cigarette in the next month.

31. Spending a lot of money on cigarettes after having a baby makes it:

Much more difficult: ____:____:____:____:____ Much easier for me to **NOT** smoke
at least one (1) cigarette in the next month.

32. My father thinks that:

I should: ____:____:____:____:____ I should **NOT** smoke cigarettes after having a
baby.

33. My needing to lose weight after having a baby makes it:

Much more likely: ____:____:____:____:____ Much **less** likely that I will smoke at
least one (1) cigarette in the next month.

34. Smoking cigarettes after having a baby is a hassle:

Strongly agree: ____:____:____:____:____ Strongly **disagree**

35. Wanting to be positive role model for my child(ren) makes it:

Much more difficult: ____:____:____:____:____ Much easier for me to **NOT** smoke
cigarettes after having a baby.

36. Spending a lot of money is:

Extremely bad: ____:____:____:____:____ Extremely good

37. Smoking cigarettes after having a baby, is a way of rewarding myself:

Strongly agree: ____:____:____:____:____ Strongly disagree

38. My **NOT** smoking at in the next month will improve my health:

Extremely likely: ____:____:____:____:____ Extremely unlikely

39. Smoking cigarettes after having a baby, means that I have to smoke outdoors:

Strongly disagree: ____:____:____:____:____ Strongly agree

40. Being bored after having a baby makes it:

Much more difficult: ____:____:____:____:____ Much easier for me to **NOT** smoke cigarettes after having a baby.

41. Social support for **NOT** smoking after having a baby makes it:

Much more difficult: ____:____:____:____:____ Much easier for me to smoke at least one (1) cigarette in the next month.

42. Being hassled is:

Extremely bad: ____:____:____:____:____ Extremely good

43. My things smelling like cigarette smoke is:

Extremely bad: ____:____:____:____:____ Extremely good

44. Being addicted to cigarettes makes quitting smoking extremely difficult:

Strongly disagree: ____:____:____:____:____ Strongly agree

45. The responsibilities of having a new baby make it:

Much more difficult: ____:____:____:____:____ Much easier for me to **NOT** smoke cigarettes after having a baby.

46. My mother thinks that:

I should: ____:____:____:____:____ I should **NOT** smoke cigarettes after having a baby.

47. Generally speaking, how much do you want to do what non-smokers think you should do?

Not at all: ____:____:____:____:____ Very much

48. My health care provider thinks that:

I should: ____:____:____:____:____ I should **NOT** smoke cigarettes after having a baby.

49. Generally speaking, how much do you want to do what your friends who smoke think you should do?

Not at all: ____:____:____:____:____ Very much

50. My friends who smoke think that:

I should: ____:____:____:____:____ I should **NOT** smoke cigarettes after having a baby.

51. The people in my life whose opinions I value would:

Appove: ____:____:____:____:____ **Disapprove** of my smoking cigarettes in the next month.

52. For me to smoke at least one (1) cigarette in the next month is:

Enjoyable: ____:____:____:____:____ **Unenjoyable**

53. I plan to smoke at least one (1) cigarette in the next month:

Strongly **disagree**: ____:____:____:____:____ Strongly agree

54. My husband/partner thinks that: I should: ____:____:____:____:____ I should **NOT** smoke after having a baby.

55. Wanting to reward myself for quitting/cutting down on smoking during my pregnancy makes it:

Much more likely: ____:____:____:____:____ Much less likely that I will smoke at least one (1) cigarette in the next month.

56. Generally speaking, how much do you want to do what your mother thinks you should do?

Not at all: ____:____:____:____:____ Very much

57. Fellow smokers think that:

I should: ____:____:____:____:____ I should **NOT** smoke cigarettes after having a baby.

58. Generally speaking, how much do you want to do what your father thinks you should do?

Not at all: ____:____:____:____:____ Very much

59. Smelling bad because of smoking cigarettes after having a baby makes it:

Extremely **unlikely**: ____:____:____:____:____ Extremely likely that I will smoke at least one (1) cigarette in the next month.

60. Improving my baby's health is:

Not important at all: ____:____:____:____:____ Very important

61. Smoking cigarettes after having a baby is socially taboo:

Strongly agree: ____:____:____:____:____ Strongly **disagree**

62. Getting back to my normal routine is:

Very important: ____:____:____:____:____ Not important at all

63. My concerns about **NOT** being able to permanently quit smoking after having a baby make it:

Much more difficult: ____:____:____:____:____ Much easier for me to smoke at least one (1) cigarette in the next month.

64. Relieving my stress level is:

Not important at all: ____:____:____:____:____ Very important

65. Being around other smokers makes quitting:

Much more difficult: ____:____:____:____:____ Much easier for me after having a baby.

66. My feeling guilty about smoking after having a baby would make it:

Much more likely: ____:____:____:____:____ Much less likely that I will smoke at least one (1) cigarette in the next month.

67. An increased level of stress after having a baby makes quitting smoking:

Much more difficult: ____:____:____:____:____ Much easier

68. Improving my health is:

Not important at all: ____:____:____:____:____ Very important

69. Generally speaking, how much do you want to do what your health care provider thinks you should do?

Not at all: ____:____:____:____:____ Very much

70. If I smoke cigarettes after having a baby, it will be bad for my baby's health:

Extremely likely: ____:____:____:____:____ Extremely unlikely

71. Smoking cigarettes makes things (e.g. clothes, furniture) smell bad:

Strongly agree: ____:____:____:____:____ Strongly disagree

72. Controlling my weight is:

Not important at all: ____:____:____:____:____ Very important

73. It is expected of me that I will **NOT** smoke cigarettes in the next month:

Strongly agree: ____:____:____:____:____ Strongly disagree

74. Please estimate how often you have smoked at least one (1) cigarette in the last month:

Never: ____:____:____:____:____ Every day

75. Smoking cigarettes after having a baby is part of getting back to my normal routine:

Strongly agree: ____:____:____:____:____ Strongly disagree

76. For me to smoke at least one (1) cigarette in the next month is:

Harmful: ____:____:____:____:____ Beneficial

77. It is mostly up to me whether I smoke cigarettes in the next month:

Strongly agree: ____:____:____:____:____ Strongly disagree

78. Smoking cigarettes in the next month will help me relieve stress in my life:

Extremely likely: ____:____:____:____:____ Extremely unlikely

79. I am addicted to cigarettes:

Likely: ____:____:____:____:____ Unlikely

80. Social support from other people to **NOT** smoke cigarettes will have an effect on my smoking after having a baby:

Strongly agree: ____:____:____:____:____ Strongly disagree

81. I worry about my baby's health:

Frequently: ____:____:____:____:____ Never

82. Smoking after having a baby makes me feel guilty:

Strongly agree: ____:____:____:____:____ Strongly disagree

83. For me to smoke at least one (1) cigarette in the next month is:

Worthless: ____:____:____:____:____ Valuable

84. Having a new baby involves a lot of new responsibilities:

Strongly agree: ____:____:____:____:____ Strongly disagree

85. It costs a lot of money to smoke cigarettes after having a baby:

Strongly agree: ____:____:____:____:____ Strongly disagree

86. Smoking cigarettes makes me smell bad:

Strongly agree: ____:____:____:____:____ Strongly disagree

87. It is boring after having a baby:

Strongly agree: ____:____:____:____:____ Strongly disagree

88. I experience cravings/urges for cigarettes after having a baby:

Strongly agree: ____:____:____:____:____ Strongly disagree

89. My husband/partner's smoking affects my smoking after having a baby:

Strongly agree: ____:____:____:____:____ Strongly disagree

90. How often does smoking cigarettes help you manage your stress?

Frequently: ____:____:____:____:____ Never

91. Caring for a new baby is stressful:

Strongly disagree: ____:____:____:____:____ Strongly agree

92. For me to smoke at least one (1) cigarette in the next month is:

Good: ____:____:____:____:____ Bad

93. I need to lose a lot of weight after having a baby:

Strongly agree: ____:____:____:____:____ Strongly disagree

94. Smoking cigarettes after having a baby affects my being a positive role model for my child(ren):

Strongly agree: ____:____:____:____:____ Strongly disagree

95. I am worried that I will **NOT** be able to permanently stop smoking cigarettes after having a baby:

Strongly agree: ____:____:____:____:____ Strongly disagree

96. Breastfeeding affects my smoking after having a baby:

Strongly agree: ____:____:____:____:____ Strongly disagree

97. For me to smoke at least one (1) cigarette in the next month is:

Pleasant: ____:____:____:____:____ Unpleasant

98. I expect that smoking cigarettes will make my children's clothes smell bad:

Extremely unlikely: ____:____:____:____:____ Extremely likely

99. I expect that I will need breaks from taking care of my baby:

Strongly agree: ____:____:____:____:____ Strongly disagree

100. The military lifestyle places more stress on me after having a baby:

Strongly agree: ____:____:____:____:____ Strongly disagree

101. My smoking is a difficult habit to break:

Strongly agree: ____:____:____:____:____ Strongly disagree

102. Smoking after having a baby is a reward for quitting/cutting down on smoking during my pregnancy:

Strongly agree: ____:____:____:____:____ Strongly disagree

103. I expect that smoking cigarettes after having a baby will negatively affect my health:

Strongly agree: ____:____:____:____:____ Strongly disagree

104. Being around other smokers makes me more likely to want to smoke:

Strongly agree: ____:____:____:____:____ Strongly disagree