Attributional styles of women who quit or reduce smoking in the antepartum

Patricia T. Alpert

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ATTRIBUTIONAL STYLES OF WOMEN WHO QUIT OR REDUCE SMOKING IN THE ANTEPARTUM

by

Patricia T. Alpert

A Dissertation Proposal in Partial Fulfillment of the Requirements for the Degree of Doctor of Public Health in Preventive Care

March, 2005
Each person whose signature appears below certifies that this dissertation, in his/her opinion, is adequate in the scope and quality as a dissertation for the degree of Doctor of Public Health.

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ABSTRACT OF THE DISSERTATION

Attributional Styles of Women Who Quit or Reduce Smoking in the Antepartum

by

Patricia T. Alpert

Doctor of Public Health in Preventive Care

Loma Linda University, Loma Linda California, 2005

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Background: Researchers in the field of smoking have sought to identify variables that predict whether or not pregnant smokers stop or continue to smoke. Most variables examined are demographic in nature and little is known about psychological variables associated with those who quit or reduce smoking while pregnant.

Purpose: To analyze attributional style and locus of control to determine which factors alone, or in combination, are associated with quitting versus reduced smoking among pregnant smokers.

Methodology: Pregnant smokers who quit (n = 66) or reduced their smoking (n = 43) were identified by the nursing staff at a women’s county out-patient clinic in Las Vegas and were interviewed by telephone between March 2002 and August 2004. Subjects completed measures of attributional styles, locus of control and smoking habits. The Beck Depression scale was administered to control for depression.

Results: Both groups had similar attributional styles, which were pessimistic (below
the midpoint of zero on the scale of -18 to +18); however, quitters (mean=-1.7) were
significantly less pessimistic than reduced smokers (mean=-3.4) (p≤ 0.001). There were
no differences in locus of control between the two groups. Compared to reduced
smokers, quitters were younger (median=22 vs. 26, p=0.036) and less likely to live with a
smoker (57.6% vs. 72.1%, p≤0.03). More quitters stopped at <2 weeks (28.8%) or 1-2
months (40.9%) of being pregnant compared to reduced smokers who changed their
smoking habits at 1-2 months (41.9%) or 3-4 months (37.2%) into pregnancy (p<0.001).
There were no differences between groups on education, ethnicity, marital status, parity,
or amount smoked prior to pregnancy. Depression was not associated with smoking
status.

Implications for Preventive Care: Reduced smokers were more pessimistic,
especially for internal causality for negative situations, which indicates a personality
difference between groups. This suggests attribution therapy may be effective for
reduced smokers to encourage them to quit completely.
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CHAPTER 1
INTRODUCTION

Very little is known about why some pregnant smokers become quitters while others choose to reduce the amount they smoke. While most pregnant smokers understand the association between prenatal smoking and adverse birth outcomes, many choose to reduce the number of cigarettes smoked rather than quit all together; in fact, only 30% of pregnant women manage to quit smoking entirely (Floyd, Rimer, Giovino, Mullen, & Sullivan, 1993). Both quitters and reduced smokers indicate fear for the infant’s health as the major motivator influencing their change in smoking behavior.

Cross-sectional studies identifying determinants of smoking or smoking cessation in pregnancy describe demographic data, such as age, education, socioeconomic status, marital status, and parity. Other factors associated with smoking during pregnancy include having a significant other who smokes, depression in pregnancy, nicotine dependence, and increased stress (Ebrahim, Floyd, Merritt, & Holtzman, 2000; Goldstein, Abela, Buchanan, & Seligman, 2000). Very little is known about the attributional styles, specifically optimistic and pessimistic explanatory styles and locus of control, of pregnant women who either quit or reduce the amount they smoke.

This study examined the relationship between attributional styles and locus of control of pregnant women who quit or reduced their smoking to learn more about the variables which may predict such behavior. To date, most studies have relied on retrospective self-report data of attributions and smoking behaviors during pregnancy, thus the question of why smoking patterns change for pregnant women remains unclear.
This question will be analyzed from the context of attributional theory during the period of role transition into motherhood.

A. Problem Statement

Most smokers are aware that cigarettes are harmful to their health, yet they continue to smoke (Healton, 2000). Pregnancy is a major life event which motivates women to stop or decrease smoking in order to reduce the risk of negative birth outcomes. It is estimated that approximately 30% of women smokers quit during pregnancy (Fingerhunt, Kleinman, & Kendrick, 1990; Gantt, 2001; USDHHS, 1990). In spite of the knowledge that smoking exerts harmful effects to the unborn child, feelings of guilt, and the enormous social pressure to quit, many pregnant women continue smoking to control mood states or satisfy their “addiction” to cigarettes (Gillies, Madeley, & Power, 1989). Many theories have been utilized to explain the cognitive disconnection between what pregnant smokers know and how they behave.

According to Mullen (2004), it is the readiness to change not the type of intervention initiated that is the primary mediator for successful outcomes of smoking cessation. Based on this premise, attempts to understand the events surrounding pregnant smokers have led to the formulation of various health models/theories to explain the behavioral, emotional, and cognitive circumstances in the process of smoking and smoking cessation. In 1979, Simon suggested that motivational or developmental constructs such as attribution theory be used as marker variables to help researchers and health care providers better understand the interaction patterns of “people problems” (why people engage in risk-taking behaviors). He felt gaining insight into the “whys” of
the problem would increase the robustness of problem solving intervention therapies. Researchers utilizing attribution theory turned to the natural history of smokers for guidance in understanding the process that identify successful quitters from those who chronically fail, their findings were conflicting at best (Hunt & Bespalee, 1974; Simon, 1979).

Other smoking cessation models explain the progression from smoker to ex-smoker utilizing levels or stages of change whereby, quitting is not viewed as an acute event, but a dynamic and cyclical process that occurs over time (Prochaska & DiClemente, 1982). According to Prignot (2000), the reality of smoking and consequences of continuing this behavior creates ambivalence. During the phase of ambivalence the smoker makes preparations to stop smoking and enters the phase of initial cessation when she stops smoking. Some are fortunate enough to maintain their ex-smoker status but frequently individuals eventually relapse back to smoking. Prignot notes that individuals usually move through the cessation-relapse-cessation cycle several times before achieving true success. This model, Stages of Change, provides a schematic of the smoking cycle, but does not explain the “whys” of cessation and relapse.

The Transtheoretical Model has been utilized frequently to explain smoking cessation and relapse back to smoking. This model discusses the linear progression of stages of change (precontemplation, contemplation, action, and maintenance) individuals move through to overcome or resolve a problematic behavior. This model implies the presences of intrinsic motivation for change influenced by the degree of self-efficacy residing within the person and does not address the individual’s innate personality traits (DiClemente & Haug, 2001; DiClemente & Prochaska, 1982). While this is a meaningful
way to begin to understand human behavior it does not entirely explain the true essence of the phenomenology underlying human behavior because it lacks the answers to what motivates behavior.

One cognitive behavioral model frequently used to explain the “whys” of behavior is attribution theory. A review of the literature on this theory leads one to understand that there is no single “attribution theory”. Rather, attribution theory refers to a broad group of theories concerned with causal reasoning about events or behaviors. The basic tenet of the theories used to explain good and bad events in health centers around self-attributions of health behaviors as defined by Abramson, Seligman, and Teasdale (1978). Their concept of explanatory styles accounts for the diversity of people’s responses to uncontrollable bad events. They state that individuals who explain such events with stable, global, and internal causes show more severe helplessness deficits than people who explain them with unstable, specific, and external causes.

Attribution theory, which focuses on people’s inferences about good and bad events, may provide a useful foundation from which to understand smoking behaviors during the prenatal period. It describes the way the average person understands and explains events that occur in his or her life and uses these explanations (or attributions), as determinants or predictors of behavior (Weiner, 1982). Thus, attributions are inferences about the cause of an event (e.g., reduced smoking) that is organized in ways that make it meaningful within a person’s life. While it is thought that attributions occur naturally in everyday events, Weiner (1991) states that attributions are more likely to occur when one experiences successes and failures, but particularly after failed experiences such as relapsing after a quit attempt. This is because failure initiates
confusion which sends individuals seeking to understand the “whys” of what happened, consequently, they make causal attributions. Thus, since attributions are likely to occur for both quitters and reduced smokers, but particularly for reduced smokers presumably because are more likely to have pessimistic attitudes about quitting entirely, attribution theory holds the potential to explain why some pregnant smokers choose to quit entirely while other merely cut back on the amount they smoke (Curry, Marlatt, & Gordon, 1987). While this is a plausible explanation of behavior change some reduced smokers may not see their failed attempt to quit entirely as a failure. Rather they may perceive their reduced smoking as being some what successful.

Locus of control is generally seen as a bipolar dimension where an increase in external control indicates a decrease in internal control. According to Wong and Sproule (1984), internal and external locus of control are separate dimensions and an individual’s locus of control may be located anywhere in this two-dimensional space. Based on this premises it is possible for individuals to have high internal and external control simultaneously. These individuals are referred to as bilocals. From the attribution standpoint bilocals are differentiated as individuals with either high internal or external control. Controllers usually explain outcomes using a single sufficient internal causal schema while controllees use a single external causal schema. In terms of responsibility attributions, controllers frequently take credit for success and are more inclined to blame others for failure and controllees externalize success and blame their own inadequacy for failure. Because internal-external causality is orthogonal to locus of control, the latter will also be explored as it relates to the way pregnant women assign responsibility for their smoking behavior to internal or external factors.
B. Purpose of the Study

This descriptive study examined the attributional styles and locus of control for women who became quitters or reduced smokers during the antepartum.

C. Assumptions of This Study

The following assumptions of attribution theory guided the design of the study:

1. Knowledge deficit is not the reason pregnant women continue to smoke.

2. Pregnant women who become reduced smokers do so as a risk reduction strategy to minimize the harmful effects to their unborn child.

3. Pregnant women are motivated to understand the causal structure of their environment (Wong & Weiner, 1981).

D. Research Questions

The following research questions were addressed in this study:

1. Are pregnant women who make internal, stable and global attributions about smoking more likely to be reduced smokers than quitters in the prenatal period?

2. Are pregnant quitters more likely to have bilocal orientation (both internal and external locus of control), and reduced smokers more likely to have either highly internal or highly external locus of control orientation?

E. Theoretical Framework

To better understand the cognitions which underlie smoking behaviors during pregnancy, attribution theory served as the framework for this study. This theory was deemed the most fitting since its cognitive approach to understanding behavior involves pregnant women’s search for explanations to interpret or understand the events related to their smoking behavior in their relatively stable environment (Weiner, 1972; Weiner,
1985; Weiner, 1991; Weiner, 1995). Thus, attribution theory deals with the “why” or causal explanations for the relationship between events and the reasons people use to explain the event. The basic premise of this theory states that an individual’s causal ascriptions for successes (quitting) or failures (relapsing or reduced smoking) influence future expectations, affect, and behavior, which in turn, helps to maintain self-esteem and reduce anxiety (Abramson, Seligman, & Teasdale, 1978; Caprara, Pastorelli, & Weiner, 1997; Curry, McBride, Grothaus, Lando, & Pirie, 2001; Dua, 1994; Martinko & Thomson, 1998; Russell, 1982; Weiner, 1972; Wong & Weiner, 1981). These explanations or attributions may be perceptions and inferences not only about events, but about others or self.

This theory explains motivational and behavioral consequences of attribution utilizing four causal dimensions.

1. **The Locus of Causality Dimension**

The locus of causality dimension looks at locus of control in a causal dimension, that is, it deals with the perceived controllability or uncontrollability of causes of events. Weiner (1972) suggest that effort, ability, task difficulty, and luck explain the degree to which an individual perceives an outcome was caused by the person’s own action. Individuals who posses internal causality perceive the cause resides within themself. In situations where one ascribes internal causality, that individual is confident of a successful outcome because she is in control of her destiny. External causality indicates that the individual attributes outcomes to some outside uncontrollable environmental characteristic. For example, a pregnant smoker who quits smoking does so because she feels she has the ability and skills to prevent her from relapsing, whereas a
reduced smoker will more likely attribute her continued smoking to living with a spouse who smokes (Wong & Weiner, 1981).

2. The Control Dimension

The control dimension is concerned with the extent of one’s control or mastery of causal factors. This dimension is interrelated with the dimension of causality in the sense that an individual who perceives the self as having internal locus of control will experience greater confidence for achieving or maintaining the desired behavior. Individuals who utilize external locus of control to explain causality have lower confidence levels for achieving and maintaining desired behaviors. An example is a pregnant women who wants to stop smoking will feel confident that she will not fail because she stopped during her previous pregnancy, while a pregnant smoker who reduces the number of cigarettes smoked is likely to have a more pessimistic attitude for quitting because she was not able to quit during her prior pregnancy (Siero, Van Diem, Voorrips & Willemsen, 2004).

3. The Stability Dimension

The stability dimension is concerned with changes due to a causal event over time according to perceptions of how stable or unstable the attribution is. Attributing the cause of a negative outcome to stable factors will produce deficits with greater chronicity than an attribution of unstable or temporary factors. According to Seligman (1998), stability deals with the idea of permanence, meaning people who perceive bad experiences will always be with them have a pessimistic outlook. Those who view bad experiences as temporary or nonpermanent have more optimistic natures. For example, a pregnant woman who fails to quit smoking during her last three
pregnancies may tell herself, “I can’t quit, I’ll always be addicted to smoking, cessation programs won’t work.”

4. The Globality Dimension

The globality dimension refers to the generalizability of a causal factor to other situations or people. This dimension encompasses a range of generalizability from specific to global. This specific-global dimension categorizes causes in terms of stability across situations. Causes of negative outcomes attributed to global factors are thought to generalize further, involving a greater array of behaviors than those attributed to specific factors. The pregnant woman who is disappointed because she cannot quit smoking and perceives herself a failure in everything she does, is ascribing her misfortune in global terms.

Utilizing the four dimensions (controllable/uncontrollable, internal/external, stable/unstable, and global/specific) to explain a pregnant woman's attribution for becoming a quitter or reduced smoker, one can predict that if she ascribes the cause of her smoking behavior to external, controllable, unstable, and specific factors (optimistic attribution) she is more likely to quit smoking completely (Seligman, 1998). For example, a pregnant woman views her lapse back to smoking as an isolated event, occurring because she was out with friends, but she declares it will not happen again because she has the skills to prevent another mishap.

Weiner (1972) suggested that explanations of causal events in terms of causal dimensions can vary greatly from person to person and from situation to situation. Much of Weiner's (1972; 1979; 1985; 1986; 1988; 1995) work in this area focused on a two-dimensional array consisting of a continuum from stable to unstable attributions (which
involve the stability of a cause over time), internal and external causality, and internal to external locus of control attributions. Other attribution theorists, however, do not suggest that locus of causality, stability, and internal-external controls are the only causal dimensions by which individuals make attributions. The dimension of globality as proposed by Abramson, Seligman, and Teasdale (1978) need also be considered when examining explanatory styles. According to these researchers globality is a key concept when examining trait-like attributional tendencies, specifically optimism and pessimism (McAuley, Duncan, & Russell, 1992).

Research findings utilizing all four causal dimensions indicate that the most frequently used constructs in attributional search focus on locus (internal-external) and control dimensions of causality (Wong & Weiner, 1981). However, the construct originally proposed by Weiner (1972), of causality involving locus and control dimensions, do not address the trait-like attributional tendencies described by Abramson, Seligman and Teasdale (1978) which encompasses the element of optimism versus pessimism. Therefore, this research study utilized the theory of attribution that includes the explanatory style construct as the framework to describe differences in pregnant women who quit or reduce their smoking.

F. Importance to Preventive Care

The author is not aware of other studies which look specifically at personality types of pregnant women who quit versus reduce their smoking. Therefore, the present findings can be looked upon as a starting point to more closely examine what role, if any, personality plays in smoking behaviors during pregnancy. While a difference in internal-external causality between the two groups for attributional styles (reduced smokers
scoring higher in internal causality for negative events) was found, it is felt that this area warrants further investigation. Additional research is needed to build upon these findings to know if a distinct personality type exists between those who quit and those who reduce smoking during the antepartum period. Second, this study adds to the knowledge base of smoking behavior change during pregnancy, thus reinforcing to some extent findings of earlier studies. For, instance, this study supports the fact that age is a predictive variable for those who quit smoking during pregnancy while, contrary to previous research, variables such as ethnicity, education, parity and living with a smoker were not. This finding may reinforce previous findings which identify the most important variables as predictors of pregnant women who stop smoking versus reduce smoking. Identifying and prioritizing predictive variables can help preventive care specialists provide timely and appropriate intervention to pregnant women who reduced smoking. Finally, insight into pregnant women's smoking behavior can help current prevention and intervention programs refine techniques to more successfully meet the specific needs of women smokers of childbearing age.
CHAPTER 2
LITERATURE REVIEW

A. Introduction

Approximately 27.2% of reproductive age women smoke; this translates to about 14 million women ages 18-44-years of age, who smoke cigarettes. This estimate reflects a declining rate for women smokers of reproductive age from 34% in 1965 to 21% in 2000 (Paterson, Neimanis, & Bain, 2003; Trosclair, Husten, Pedersen, & Dhillon, 2002). Despite the decrease in smoking rate, this figure far exceeds the Healthy People 2010 goal of less than 12% (CDC, 2002) smoking rate among pregnant women. If this trend continues, smoking will have an enormous health impact the physical well-being of mothers and their children as well as a financial burden to the national health care system. The sequelae of smoking during pregnancy is dependent on the woman’s choice to quit or continue smoking, which is in turn, is influenced by their beliefs or attitudes about smoking and its harmful effects on the fetus (Tod, 2003). The degree of perceived behavioral control women possess, according to Bennett and Clatworthy (1999), is paramount to understanding their motivation to action.

1. Smoking Before Pregnancy

There is mounting evidence that cigarette smoking adversely affects reproductive function at all stages. During the preconception stage, women who smoke may have reduced fertility to about 72%, with heavy smokers experiencing lower fertility rates than light smokers. In addition, these women are 3.4 times more likely to take longer than a year to conceive when compared to their nonsmoking counterpart
Conception, while a current smoker, carries a modest increased risk for ectopic pregnancy as well (USDHHS, 2001).

Some women quit smoking in response to wanting to become pregnant ("spontaneous quitters"). Very little is known about these women’s smoking cessation patterns and relapse behaviors. In a study of Swedish women’s smoking habits, Cnattinguis (2003) reported that 22% of women were spontaneous quitters. In another descriptive study, the population of spontaneous quitters ranged from between 25 to 35% (Sexton, 1987). Quinn, Mullen and Ershoff (1991) reported spontaneous quitters make up 41% of the prepregnancy population. They claim that the major characteristic which sets spontaneous quitters apart from those who quit during pregnancy is the number of cigarettes smoked. Women who quit smoking prior to pregnancy smoke fewer cigarettes, the majority do not have another smoker in their household (Cnattinguis, 2003), and they experience greater frequency of nausea while pregnant (Quinn, Mullen, & Ershoff, 1991). They are more likely to schedule their first prenatal appointment sooner than women who continue smoking during pregnancy, have more years of education (Hajek et al., 2001; Ockene et al., 2002), and hold a strong belief that maternal smoking is harmful to the unborn fetus (Quinn, Mullen, & Ershoff, 1991; Pirie, Lando, Curry, McBride, & Grothaus, 2000). However, approximately one-fifth of spontaneous quitters relapse back to smoking prior to delivery (Quinn, Mullen, & Ershoff, 1991; Solomon & Quinn, 2002).

Overall, a small percentage of women smokers who wish to become pregnant quit smoking, most of them with no formal intervention as they are more aware of the risk of smoking. Additionally, they distinguish themselves form other women smokers by their ability to make multiple health behavior changes simultaneously (Pirie, Lando, Curry,
McBride, & Grothaus, 2000). While they are willing to healthier life-styles during pregnancy, their smoking prior to pregnancy contribute to possible delayed conception and risk for several negative pregnancy outcomes.

2. *Smoking During Pregnancy*

Smoking during pregnancy significantly increases the risk for spontaneous abortion, premature delivery, perinatal death, stillbirth, and low birth weight (McLeod, Pullon, & Cookson, 2003; USDHHS, 2001). There is a direct link between smoking and abruptio placenta, bleeding during pregnancy, premature rupture of membranes, amnionitis, preeclampsia, and preterm delivery (Berman & Gritz, 1988; Chan, Keane, & Robinson, 2001; Cnattingius, 2003; Kyrklund-Blomberg, Gennser, & Cnattingius, 2001; Ness et al, 1999; Rasmussen, Irgens, & Dalaker, 1999; USDHHS, 1989; USDHHS, 2001; Jeitlin, Ancel, Saurel-Cubizolles, & Papiernik, 2001; Venner, et al, 2004). The risk for miscarriage is 30% to 70% greater for pregnant smokers compared to their nonsmoker counterparts (Desmond, Price, & Losh, 1987) and this risk increases with the amount smoked (Ananth, Smulian, & Vintzileos, 1999; USDHHS, 2001).

The known harmful affects of smoking during pregnancy results in intense social pressure to quit smoking (Wong & Koren, 2001). In spite of this, 21% of women smoke throughout their pregnancies (Williamson, Serdula, Kendrick & Binkin, 1989), although one-half of them decrease the number of cigarettes smoked daily (Haug, Aaro, & Fugrili, 1992; Lawrence, Aveyard, & Crogham, 2003; Severson, Andrews, Lichtenstein, Wall & Zoref, 1995; Wakschlag, Pickett, Middlecamp, Walton, Tenzer, & Leventhal, 2003), with 10 cigarettes being the mean number smoked per day (Ebrahim, Floyd, Merritt, Decouflé, & Holtzman, 2000). Women who continue to smoke during pregnancy are more likely to
be single compared to those who quit (Dodds, 1995; Muhajarine, D’Arcy, & Edouard, 1997). Additionally, they are more likely to have an unplanned pregnancy (Connor & McIntyre, 1999), have difficulty establishing regularity and stability in their daily lives, are more likely to display reckless behavior (Wakschlag, Pickett, Middlecamp, Walton, Tenzer, & Leventhal, 2003) and consume greater amounts of coffee (more than three cups per day) (Connor & McIntyre, 1999; Olsen, 1993), alcohol and tea (Windham, Bottomley, Birner, & Fenster, 2004). Thus, it appears that women who continue to smoke while pregnant engage in a variety of other risk behaviors.

Ruggiero, Everett, Tsoh, Rossi and Guise (1992) examined smoking attitudes of pregnant and nonpregnant women. They found smoking attitudes to be more polarized in those who were pregnant. That is, pregnant women are either more motivated to quit or more fixed in their intention to continue smoking than nonpregnant women. Curry, McBride, Grothaus, Lando and Pirie (2001) found that at the beginning of pregnancy, women are more motivated to quit smoking, but as the pregnancy progressed motivation levels decreased in women who fail to quit smoking. They concluded that the salient concern for a healthy pregnancy diminishes as the pregnancy progresses. Bennett and Clatworthy (1999) found that women who continued smoking during pregnancy thought smoking to be less harmful than women who quit. They also believed and positively endorsed the belief that smoking results in smaller babies, making childbirth easier.

Looking specifically at low birth weight infants, MacArthur and Knox (1988) found that women who smoked throughout their pregnancies delivered babies weighing 213 grams less than babies born to women who quit during pregnancy. Approximately 13% of all preterm infants come from women who smoke during pregnancy (Desmond,
Price, & Losh, 1987). Walsh, Lowe, and Hopkins (2001) compiled substantial evidence which indicates low birth weight infants of smokers may be due to the chemical effects found in tobacco. There are also biological concomitants which are likely to contribute to poor fetal outcomes, specifically, nicotine and carbon monoxide. The pathophysiological effects of smoking result in decreased oxygen availability leading to intrauterine hypoxia that disrupts the growth and development of the fetus (Levy & Koren, 1990).

Other components of cigarette smoke also readily cross the placenta and can activate the conversion of procarcinogens to mutagens in both fetal and placental tissue (Wisborg, Henriksen, Obel, Skajaa, & Ostergaard, 1999). Utilizing animal models, the derivatives of cigarette smoke is an active transplacental carcinogen (Nicolov & Chernozemsky, 1979). If these findings can be translated to humans, maternal smoking predisposes the fetus to an increased risk of developing cancer in later years.

Research also suggest a relationship exists between prenatal smoking and other birth outcomes, specifically low or depressed one and five minute Apgar scores (Garn, Jonston, Ridella, & Petzold, 1981), oral clefts (Khoury, et al, 1987), and sudden infant death syndrome (SIDS) (Wisborg, Kesmodel, Henriksen, Olsen, & Secher, 2000). The overall mortality rate of infants born to women who smoke is 10% to 100% greater than infants born to nonsmoking mothers (Desmond, Price, & Losh, 1987). Other preliminary studies suggest a dose-related association between the numbers of cigarettes smoked during pregnancy and the risk of childhood cancers (Stjernfeldt, Lindsten, Berglund, & Ludvigsson, 1986) and childhood emotional, and behavioral problems, including autism (Hullman, Sparen, & Cnattingius, 2002), and a three-fold risk of attention-deficit/hyperactivity disorder (ADHD) (Milberger, Bioderman, Faraone, Chen, & Jones,
In addition, infants born to smokers also manifest intellectual and developmental deficits (Butler & Goldstein, 1975; Rantakallio, 1983; Sexton, Fox, & Hebel, 1990). Heath and Martin (1993) found a relationship between prenatal smoking and the likelihood that the off-spring, especially females, will smoke. They suggest a heritable pharmacological effect to nicotine is passed on from parent to child. Hutchison, Stevens, and Collins (1996) suggest this prenatally induced predisposition to nicotine addiction is a result of nicotine’s effect on the developing dopaminergic systems in the brain. Brennan, Grekin, Mortensen and Mednick (2002) found a dose response relationship between the number of cigarettes smoked during the prenatal period and both criminal activity and psychiatric hospitalizations for substance abuse in male and female offspring.

In conclusion, the effects of smoking during pregnancy are far reaching and do not stop at the birth of the infant. If the pregnancy produces a viable infant, the potential for long term sequelae are numerous and in some situations, devastating. Given these consequences, it seems logical that expectant mothers would stop smoking. However, a woman may not be able to stop smoking due to both the physical and psychological dependency on cigarettes.

3. Smoking Cessation During Pregnancy

Spontaneous quit rates during pregnancy exceed that in the general population (USDHHS, 1988). Approximately 20 to 40% of women smokers quit while pregnant (McBride & Pirie, 1990; Severson, Andrews, Lichtenstein, Wall, & Akers, 1997). Of those who quit, 27.4% quit in the first trimester of their pregnancies (Fingerhut, Kleinman, & Kendrick, 1990), demonstrating the greatest intention to quit
compared to women who quit later on in pregnancy (Hutchison, Stevens, & Collins, 1996). These women smoke fewer cigarettes per day prior to pregnancy, but are considered to be heavier smokers than those classified as spontaneous quitters (Fingerhut, Kleinman, & Kendrick, 1990). Bennett and Clatworthy (1999) attempted to explain this finding by analyzing the levels of “addictiveness” for pregnant smokers who quit smoking. They found that craving for cigarettes was lower in those who stopped smoking during pregnancy than those who were unable to stop.

Other factors that predict the odds that women would quit smoking are greater for those having their first baby compared to women who have previously given birth (Connor & McIntyre, 1999; O’Campo, Faden, Brown, Gielen, 1992). In addition, quitters are more likely to be more highly educated and older when they first started smoking (Lindqvist & Aberg, 2001; Yu, Park, & Schwalberg, 2002).

Fetal health consequences and fear of adverse pregnancy outcomes are frequently motivators to quit for pregnant women who stop smoking (Bennett & Clatworthy, 1999; Connor & McIntyre, 1999; Edwards & Sims-Jones, 1998; Ratner, Johnson & Bottorff, 1999). In a study by O’Campo, Faden, Brown, and Gielen (1992), 75% of women who stopped smoking cited fetal health concerns as the reason for quitting. Another 8% said they stopped smoking because of advice received from family or physician and 6% stopped smoking because of the nausea and ill effects they experienced while smoking.

If a woman decides to quit smoking in later stages of pregnancy there is still a positive benefit for the infant. Several studies have shown a positive effect on the infant’s birth weight and intrauterine growth (Fingerhut, Kleinman, & Kendrick, 1990; Kramer, 1987; Messecar, 2001) with quitting. MacArther and Knox (1988) concluded that while
earlier smoking cessation resulted in higher infant birth weights, quitting as late as 30 weeks gestation resulted in increased birth weight. The research literature does not specify a reduced incidence of other sequella associated with smoking cessation later in the prenatal period.

B. Attribution Theory: Application in Health and Smoking

When someone experiences a failure to perform a task as anticipated it is common for the individual to ask "why" questions to clarify the causes of the failure in expected behavior. The idea that people spontaneously engage in the search for the reasons behind behaviors is felt to be a natural occurrence (Seligman, 1998). This process is known as the search for attributions. This section reviews the literature on attributions and the attributional variable/construct of locus of control as they relate to health and smoking.

1. Attribution Theory

a. Historical Development of Attribution Theory. The search for causal explanations began with the work of Heider (1954). He posits that people use "common sense psychology" to explain the occurrence of events. In other words, he is concerned with what the "common man," not the sophisticated psychologist, uses to analyze causality. According to Heider, the result of actions are dependent on the locus of cause which is either within or outside of the individual.

Over the years other attribution theorists have extended Heider's original theory (Antaki, 1982). One such embellishment is the expansion of Heider’s categories of internal and external attribution by Weiner (1972) who added another dimensional construct consisting of the continuum from unstable to stable attributions over time (e.g.,
the stability of a cause over time). Weiner’s idea of stability of the cause refers to its perceived degree of permanence and viewed locus of control as a causal dimension with controllability-uncontrollability being directly related to perceived control of cause. Utilizing these three dimensions, Weiner believes one can see the attributions people assign to explain their successes and failures and such explanations allow one to make predictions about how that attribution affects future experiences. He advocates that the location of the attribution (internal-external) influences self-esteem and affect.

Another modification to this theory is the attributional reformulation eliminating Weiner’s concept of controllability and replacing it with the concept of globality. This reformulation is what Abramson, Seligman, and Teasdale (1978) calls learned helplessness theory. In their research on learned helplessness they noticed that noncontingency between behavior and outcome in failure conditions lead people to make attributions not only in the unstable-stable and internal-external dimensions but also in another dimension they labeled as specific-global. The three dimensions collectively comprise the optimistic-pessimistic explanatory style, also known as the diathesis-stress model described in the learned helplessness literature (Follette & Jacobson, 1987). Explanatory style (Abramson, Seligman & Teasdale, 1978) emerged as a way to account for the diversity of people’s responses to uncontrollable bad events. A person who explains such events with stable, global, and internal causes shows more severe helplessness deficits than someone who explains them with unstable, specific, and external causes. Examples of these helplessness deficits include: passivity, depression, poor problem solving, low self-esteem, poor immune function, and higher morbidity

Abramson, Seligman, and Teasdale (1978) believe that the construct of unstable-stable and specific-global are linked to depression. The stability of the attribution affects the permanence of depression and globality affects its range and extent. In other words, a person who makes attributions that are internal, stable and global for failure is more likely to be at greater risk of being depressed. Wagner, Berenson, Harding, and Joiner (1998) validated the association of depression in those with pessimistic explanatory styles in teenage pregnant women.

Overall, the three components of explanatory style, internal versus external, stable versus unstable, and global versus specific, have been helpful in measuring the way individuals interpret life events. The literature on explanatory styles is expanding, and suggests that people have a predisposition or temperament to be optimistic or pessimistic. According to attributional theory this predisposition or temperament is based on how individuals interpret previous negative and positive life experiences.

2. Attribution Theory and Concepts in Health

Individuals develop their own theories about health and disease conditions which are predicated on their knowledge level and own experiences with symptoms of poor health (Pennebaker, 1982). They make attributions about the health consequences to live healthy or unhealthy lifestyles based on the cognitive structuring of that knowledge and personal experiences.

Peterson (1988) conducted a preliminary search for a correlation between explanatory style and illness. He found that pessimistic explanatory style was associated
with stressful life events, unhealthy habits, and low self-efficacy and that these pessimistic individuals did little to change these behaviors for the better. Peterson and Lin (1990) found that college students with a pessimistic outlook develop more colds or flu’s and were less likely, when compared to their more optimistic counterparts, to enforce health benefiting behaviors for a faster recovery, such as sleeping more, curtailing activities, and increasing fluid intake. In a landmark study, Peterson, Seligman, and Vaillant (1988) examined a group of Harvard college graduates and determined that pessimistic explanatory style at age 25 predicted physical illness. They explain the occurrence of poor health outcomes by those with pessimistic explanatory styles as a result of lifestyle choices, self-care, and social support, although these variables were not assessed.

In 1982, Peterson, Semmel, Von Baeyer, Abramson, Metalsky, and Seligman developed the Attributional Style Questionnaire (ASQ) to assess attributional style for the internal-external, stable-unstable and global-specific dimensions. The ASQ is an instrument with 12 hypothetical events: six are good events, six are bad events. In addition to the good-bad distinction, half of the events are interpersonal/affiliative and the other half are achievement oriented. For every event participants are asked to write in one major cause of the event. Then participants are asked to rate the cause along the three dimensions of causality, stability and globality, and the importance of the situation. All ratings are done using a seven point Likert type scale. Internal reliability is high with alpha coefficients of .75 and .72 for the composite scales for good and bad events, respectively. The mean internal reliability for the 12 subscales for each of the attributional dimensions was .54, with mean scores ranging from .44 to .69. Overall,
there was less distinction among the three attributional dimensions for good events, but the distinctiveness of the three dimensions for bad events was more adequate, indicating the ASQ is more sensitive in identifying pessimistic attributions. Peterson, Semmel, vonBaeyer, Abramson, Metalsky, and Seligman (1982) concluded that the ASQ has considerable construct, criterion, and content validity with satisfactory reliability. They suggest that the ASQ holds the potential for providing a “means to assess habitual tendencies in the attribution of causes (p. 297)”. Attributional style research has since shown that maladaptive attributional styles for good and bad events are associated with poor physical health and depression (Alloy, Lipman, & Abramson, 1992; Maruta, Colligan, Malinchoc, & Offord, 2000; Puskar, Sereika, Lamb, Tusaie-Mumford, & McGuiness, 1999; Scheier & Carver, 1992).

According to Alloy, Peterson, Abramson, and Seligman (1984) people with pessimistic explanatory styles as assessed by ASQ tend to be poor problem solvers, therefore, experience more frequent and severe bad life events because “they never nip a crisis in the bud” (Peterson, Seligman, & Vaillant, 1988, p. 26). In an attempt to identify predictive vulnerability for alcohol use, Goldstein, Abela, Buchanan, and Seligman (2000) studied the interaction of attributional styles with negative life events as a predictor for changes in alcohol consumption. They noted that those with pessimistic explanatory styles who experience negative life events between time 1 and time 2 of the study period also increased their consumption of alcohol (spirits but not wine or beer). One explanation for the outcome is that participants with pessimistic explanatory styles do not use problem-solving coping strategies for negative life events; instead they distract themselves from the problem by drinking spirits to achieve intoxication.
Dua (1994) cautions against utilizing attributional styles alone as good predictors of health outcomes; rather, he proposes that self-efficacy and motivation need to also be considered. His research findings indicate that the collective of both negative affect caused by thoughts and attributional styles for bad events were the most predictive of psychological and physical health. Michell (1989) found that attributional styles are related to a variety of personality variables. There was a correlation between a variety of personality traits and internal, stable, and global attributions for both positive and negative events. In other words, the predictive value was greater when attributional styles were examined in combination with other variables.

3. Casual Attributions in Smoking

A number of research studies have been devoted to attributions about smoking cessation (Arnett, 2000; Anderson, & Anderson, 1990; Bredehoft, 1983; Curry, Marlatt, & Gordon, 1987; Harackiewicz, Sansone, Blair, Epstein, & Manderlink, 1987; Martin, 1990; Spanier, Shiffman, Maurer, Reynolds, & Quick, 1996), although only one study addressed attribution theory and smoking cessation of pregnant women, as well as smoking relapse in the postpartum period (Mullen, Pollak, & Kok, 1999).

Bredehoft (1983) examined causal attributions in conjunction with self-efficacy expectations in smokers who attempted to quit. He found that when attributions and self-efficacy were collectively evaluated there wasn’t statistical significance to predict smoking relapse. However, when he added demographic data to the original construct it improved the predictive power of success in abstaining from smoking. This implies that causal attributions with self-efficacy were not good predictors of smoking cessation as in studies mentioned earlier.
Martin (1990) looked at attributions of addiction and how this related to smokers' perceptions of their ability to quit. He found that among 105 male and female smokers, ascription to the label of “addicted” was not sufficient enough to believe one’s chances of stopping smoking were reduced. However, the presence of physical symptoms of addiction, regardless of attributions, were better predictors of smoking cessation.

Anderson and Anderson (1990) looked at attributional differences in smoking rates among male and female smokers and former smokers. There were differences in attributions made by both male and female former smokers as well as by current smokers. Smokers attributed their inability to stop smoking to internal and stable causes, exemplified by such statements as: “I’m addicted,” “It’s hopeless, I’ve tried to stop smoking and couldn’t.” Former smoking males cited unstable causes for their success in quitting as evidenced by the statement “I was able to quit smoking because I changed jobs,” whereas former female smokers said that stable causes such as nonsmoking family and friends were the reasons for their success. Additionally, both male and female former smokers reported more global attributions (e.g., cessation intervention programs are useless) as compared to the more specific attributions (e.g., the cessation program I attended was not helpful) reported by male and female smokers. The findings of the globality dimension were surprising since smokers are expected to hold more global attributions than ex-smokers.

Curry, Marlatt, and Gordon (1987) looked at causal attributions for maintaining abstinence and smoking lapse/relapse in a group of individuals participating in a smoking cessation program. They measured three dimensions of attributions: locus of causality, stability, and globality as well as affective reactions for both actual and hypothetical
lapse/relapse situations. This dimensional construct is based on the cognitive-behavioral model of smoking relapse, in which the affective reaction to an initial slip or lapse determines whether or not a full blown relapse ensues. Attributions made by the participants following a lapse/relapse situation indicated higher scores for external, unstable, and specific attributions, just the opposite of what was expected (e.g., higher scores for internal, stable, and global attributions). However, as expected, relapsers reported more guilt after smoking their first cigarette compared to those who slipped and regained abstinence. Spanier, Shiffman, Maurer, Reynolds, and Quick (1996) took this a step further. They followed individuals who relapsed to determine if their self-efficacy and affective responses to the relapse eventually lead to abstinence. They found that those who eventually abstained attributed their prior failure to unstable causes and had higher self-efficacy in spite of failure their interestingly, self-efficacy did not contribute to the prediction of relapse in their study.

Harackiewicz, Sansone, Blair, Epstein, and Manderlink (1987) examined attributions for both short and long-term smoking cessation by manipulating the treatment protocol to either an internal (self-help) or external (influenced by doctor’s treatment, in this case nicotine gum) method. Attributions for the decision to quit were measured prior to treatment and attributions for success or failure to quit with treatment was measured at the first follow-up visit. Those who received the gum treatment had a greater initial cessation rate when compared to those in the self-help group. However, those in the self-help group who were successful in quitting cigarettes made fewer external attributions for their success and also maintained abstention for a longer period of time. The researchers concluded that causal attributions predicted the length of time
participants remained abstinent. Curry, Wagner and Grothaus (1991) found similar results in their study on smoking interventions for smoking cessation. Schoeneman, Hollis, Stevens, Fischer, and Cheek (1988) conducted a long-term follow-up study of participants one and a half to two years after completing a smoking cessation program. Individuals who slipped and relapsed exhibited self-blame, engaged in behavior reflecting self-blame (internal, unstable, controllable, specific attributions), and attributed their relapse to characterological factors and external factors (other people or circumstances). Those who slipped and regained abstinence reported behavioral shortcomings and mood ascriptions only.

To date, there is only one study which examined successful attributions for women who quit smoking during pregnancy, specifically looking at attributions of those who relapse back to smoking in the postpartum period (Mullen, Pollak, & Kok, 1999). This prospective study examined success for maintaining long-term (one year) postpartum abstinence in a group of 392 privately insured women. The researchers looked at the relationship of self-efficacy and three attribution subscales: stability, controllability and causality. The measurement tools used in the study were adapted from Russell’s Causal Dimension Scale (1982) and DiClemente’s Self-Efficacy Scale (1981). Seventy-one percent of the sample maintained abstinence at the six week postpartum time point. Of those not smoking at the six-week time point, the stability dimension (OR = 1.76, 95% CI = 1.29-2.39) of success attributions were predictive of long-term abstinence at all other time points (3, 6, and 12 months) in the postpartum period. The path from self-efficacy to stability was significant which means that the score for self-efficacy influences the score for stability in a positive direction. Although both high
confidence to remain abstinent and stability were independently predictive of maintaining abstinence, when both variables were entered into the model, self-efficacy remained a predictor, but stability did not. About 50% of the participants who maintained abstinence attributed their success to the baby as the stable factor. The researchers did not control for the presence of postpartum depression in their sample which is unfortunate since postpartum depression could have biased their study outcome. The presence of depression could have been identified in their sample if they used the reformulated attribution scale for learned helplessness (locus of causality, stability, and globality). Another limitation of this study is the frequency with which the participants were contacted. The large number of contacts (six) could have prompted participants to provide the "right" or "correct" answer and increase maintenance as evidenced by the high success rates. Additionally, the participants all had private insurance coverage which indicates a biased sample, as these individuals were more likely to be health conscious. Attributional styles of pregnant women who reduced the number of cigarettes smoked were not examined (Seligman, 1998). Clearly, more research is needed in this area to assist health care providers to gain greater insight into smoker's attributional styles and smoking cessation.

C. Locus of Control: Application in Health and Smoking

1. Historical Prospective of Locus of Control

Locus of control is an attributional personality dimension derived from Rotter's (1966) social learning theory and later expanded into generalized health expectancies by Wallston, Wallston, Kaplan, and Maides (1976) which have been linked to a whole host of health behaviors (Balch & Ross, 1975; Caprara, Pastorelli, & Weiner,

The basic premise as cited by Rotter is that the behavior potential in a given situation is a function of the expectancy that reinforcement will occur and the value placed on the reinforcement by the individual. In other word, individuals have to believe that they are capable of performing the requisite behavior (e.g., quit smoking) to earn reinforcement (e.g., feeling healthier) and must perceive the reward as worth the effort before they carry out the behavior.

Rotter believed that two reinforcement patterns exist which lends themselves to either a general expectancy that rewards are contingent upon one’s own actions or resources (which he labels internal locus of control), or a belief that attainment of reinforcements is determined by powerful others, chance, or fate (which he refers to as external locus of control). This unidimensional construct treats internal and external control as competing or opposing factors so one cannot score high on both.

Taken in this context, locus of control should not be misconstrued for locus of causality as defined by attribution theorists. Wong and Sproule (1984) do not equate locus of control with locus of causality; instead they contend that locus of causality refers to assignment of causality to various loci such as explanation of cause based on past experiences, while locus of control is concerned with the assignment of responsibility to
internal or external factors. This counters Rotter’s (1966) locus of control construct. Thus, the locus of control and the locus of causality dimensions measure different dimensions of personality. A particular locus of causality does not determine a corresponding attribution of responsibility. In other words, according to Rotter an individual perceives internal control when one assumes responsibility for what happens even if the event was externally caused.

In general, locus of control is seen as a bipolar dimension where an increase in external control indicates a decrease in internal control. Wong and Sproule (1984), however, view internal and external control as two separate dimensions. They contend that an individual’s locus of control may be located anywhere in this two-dimensional space, thus it is possible to be high in both internal and external control simultaneously. These individuals are labeled “bilocals”, which according to Wong and Sproule (1984) hold more realistic views about the world and themselves. Bilocks perceive control occurring from both internal and external loci, they see themselves as cooperators, and not as either controllers (internal locus of control) or controllees (external locus of control), who interact with external constraints to achieve realistic goals.

From the attribution standpoint, bilocks are differentiated from individuals with either high internal or external control. Controllers usually explain outcomes using a single sufficient internal causal schema while controllees use a single external causal schema. Bilocks are more likely to evoke a multiple causal schema. In terms of responsibility attributions, controllers frequently take credit for success and are more inclined to blame others for failure and controllees externalize success and blame their
own inadequacy for failure, while bilocal cooperators are likely to share credit and blame regardless of the direction of the outcome (Wong & Sproule, 1984).

Wong and Sproule (1984) propose that bilocals may perform better than highly internal controllers especially when success on a task is determined by both internal and external factors. They reason that because bilocals are more flexible and can develop cooperative relationships easily, they cope better in stressful situations and have higher levels of adjustment or can adapt more easily.

The concept of locus of control has been explained from two different prospectives: attributional theory and Rotter’s social learning theory. Within social learning theory, analyzing behavior according to Wong and Sproule’s definition of bilocus of control may help identify pregnant smokers who quit versus those who reduce smoking because quitters share credit and blame for their smoking behavior whereas reduced smokers may internalize their failure to stop smoking completely.

2. Locus of Control and Health

One of the earliest measures of locus of control is the Internal-External (I-E) Scale (Rotter, 1966) which has been used in a wide variety of situations. Georgiou and Bradley (1992) suggest that Rotter’s scale has limited application in specific situations, particularly in the area of health locus of control because it does not address specific health dimensions. Building upon Rotter’s I-E scale, Wallston, Wallston, Kaplan, and Maides (1976) developed the Health Locus of Control Scale (HLC), a unidimensional, bipolar Likert-type measure of people’s beliefs concerning the source of control of their health. In 1978, Wallston and Wallston developed the Multidimensional Health Locus of Control Scale (MHLC) scales (Form A and Form B). The MHLC scale
was a revision and extension of the HLC scale specific to health behaviors. The MHLC scale contains three separate unipolar Internal (IHLC), Chance (CHLC) and Powerful Other (PHLC) scales of perceived control for health. The alpha reliabilities for the MHLC scales (six-item form) ranged from .673 to .767. When forms A and B were combined to a 12-item scale, the alpha reliability increased slightly to .830 to .859.

Wallston and Wallston (1981) compared normative data for health locus of control for various types of subjects. They found that individuals with relatively higher scores on the internal dimension exhibited more health promotion behaviors such as birth control use and attendance at smoking cessation programs.

Weiss and Larsen (1990) reported a positive relationship between scores on the internal subscale (IHLC) and health promoting behaviors, while Steptoe, Wardle, Vinck, Tuomisto, Holte, and Wickstrom (1994) found negative relationship between scores on the chance dimension (CHLC) and positive health behaviors. The relationship of a strong belief in powerful others (PHLC) to health, however, has been more difficult to predict (Norman & Bennett, 1996). In a study of health promoting behaviors among pregnant women, Kruse, Zweig, and LeFevre (1988) found the powerful other dimension of the MHLC scale to be strongly associated with health behaviors in pregnancy. Women who measured high for this dimension also showed distinct socio-demographic characteristics such as lower income, less education, and greater social support. They also found an interesting combination of health behaviors such women who were more likely to smoke were also less likely to drink alcohol and more likely to decrease alcohol consumption during pregnancy, and less likely to breastfeed. Since some of these health behaviors are
not health promoting, the researchers cautioned against concluding that a high powerful others orientation for pregnant women is related to positive health behaviors.

Martinelli (1999) examined the likelihood that a set of explanatory variables predict engagement in health promoting behaviors by college students. The findings indicated that individuals were more likely to practice health promoting behaviors if they had an increased self-efficacy, perceived themselves as healthy, and had a powerful external and internal (bilocal) health locus of control. A key point in Martinelli’s study is the bilocal control for powerful other measure in those who saw themselves as healthier. This is in keeping with the prospective of locus of control held by Wong and Spoule (1984) in that bilocals perceive and desire control from both internal and external loci.

Due to the inconsistencies in research findings, the overall consensus is that health locus of control and health behaviors are only moderately related (Norman & Bennett, 1996). However, Wallston and colleagues (1976; 1978) contend that relationships between health locus of control and health behaviors are strong and consistent only in people who place a high value on health. In the case of pregnant smokers, the women must highly value theirs and or their baby’s health in order to quit or even reduce smoking.

3. **Locus of Control and Smoking**

A specific area where locus of control is felt to be important is in the area of smoking research. Usually locus of control studies are embedded in Rotter’s (1966) social learning theory using general measures of locus of control. Some studies reveal a consistent relationship between locus of control and smoking behaviors, with smokers being more external in origin compared to their nonsmoking counterparts.
(James, Woodruff, & Werner, 1965; Straits & Sechrest, 1963), and ex-smokers being more internal than smokers or relapers (Rosenbaum & Argon, 1979; Strickland, 1973). Others (Burgess & Hamblett, 1994; Molloy, et al., 1997; Pederson & Lefcoe, 1976; Peltzer, 2001) found no difference in locus of control for smokers and nonsmokers. However, the literature on this construct sheds valuable light on the significance people place on their belief about control as well as the problems and inconsistencies of the findings.

Straits and Sechrest (1963) found that nonsmokers tended to have a more internal locus of control than smokers, with smokers being somewhat more chance oriented (p < .08). According to the researchers this orientation (e.g., “smoking is worth the risk of cancer”, “everyone has at least one vice, smoking is mine”), the researchers concluded, may explain why smokers, especially heavy smokers, continue their habit even in light of the health hazards associated with smoking. James, Woodruff, and Werner (1965) replicated the findings of Straits and Sechrest in a group of college students. They found that both male and female smokers scored higher on the external locus of control scale than their nonsmoking counterparts; however, the I-E Scale was not sensitive in differentiating LOC relationship and different levels of smoking (heavy versus light smoker and locus of control). Molloy, et al. (1997) surveyed 123 male and female smokers, nonsmokers and ex-smokers. They found no significant differences in locus of control between smokers and nonsmokers; however, ex-smokers scored higher on the internal measure of the I-E Scale than either smokers or nonsmokers. Burgess and Hamblett (1994) found no differences in locus of control for smokers, nonsmokers and
ex-smokers. Pederson and Lefcoe (1976) found no differences in personality and locus of control variables between a group of ex-smokers and a group of smokers.

In a review article of the locus of control in health, Wallston and Wallston (1978) summarized findings from a study by Strickland (1973). In this study, Strickland found that individuals with higher internal control scores modified their smoking behavior to a greater extent than those considered to have external locus of control. Peltzer (2001) found that among black South African university students, there were no significant differences between smokers and nonsmokers on the three subscales: internal, chance and powerful others measured on the MHLC scale.

Stuart, Borland and McMurray (1994) used the health locus of control and self-efficacy measures as predictors of outcomes in a group-facilitated smoking cessation program. Those who attempted to quit smoking had high expectations of being able to quit permanently, had decreased internal locus of control scores and smoked fewer cigarettes per day than those who continued to smoke. Abstainers had stronger expectancies of maintaining abstinence, had higher self-efficacy, and their locus of control measures indicated lower Powerful Others and higher Chance loci scores. Only higher self-efficacy predicted maintenance at six months. The authors concluded that self-efficacy was important as a predictor for attempt and abstinence situations; however, locus of control did not provide clear predictions for smoking status. Bennett, Norman, Moore, Murphy, and Tudor-Smith (1997) examined health locus of control and health values among smokers and nonsmokers from a representative sample of 11,401 individuals who completed a questionnaire. Among smokers, the MHLC and health values accounted for only 1% of the variance in smoking frequency; however, the
interaction between the chance locus and health value proved to be a significant predictor of smoking status ($\beta = .06, p < .001$). This suggests that health values moderate the relationship between locus of control and smoking status. In other words, individuals who smoked have lower health value scores and higher chance locus scores.

The notion that general expectancy measures for locus of control are inadequate identifiers of important personality characteristics for habitual behaviors evolved when studies showed poor predictive strength of generalized scales used to measure specific behaviors (Donovan & O'Leary, 1978; Rotter, 1966). Recognizing this possible shortcoming for smokers, Bunch and Schneider (1991) developed the Smoking-Specific Locus of Control Scale which they adapted from Donovan’s and O’Leary’s (1978) Drinking-related Locus of Control Scale. Ludtke and Schneider (1996) measured locus of control for smoking using the Smoking-Specific Locus of Control Scale. The coefficient alpha for the smoking specific tool was higher than the coefficient alpha calculated by Bunch and Schneider (1991) (.84 vs. .75), however, this scale and Rotter’s I-E Scale were poorly correlated. This finding suggests that individuals maintain different cognitive expectancies for specific different behaviors. The authors concluded that the Smoking-Specific Locus of Control Scale predicted outcomes better than the more general I-E Scale.

Georgiou and Bradley (1992) developed another locus of control scale specifically for smokers called the Smoking-Specific Locus of Control Scale. The authors designed this scale by modifying the general expectancy MHLC scale. This scale should not be confused with the smoking-specific locus of control scale developed by Bunch and Schneider (1991). Georgiou and Bradley’s (1992) scale differs, they took the
three dimensions (internality, powerful other and chance) of the MHLC, added a fourth dimension (significant other), and reworded the variables to smoking specific situations. The original scale had 32 items, balanced for both positive (referring to success in giving up smoking) and negative (referring to failure in giving up smoking) smoking situations. This was consistent with attributional research which has demonstrated differences in response according to whether or not the outcome was positive or negative, meaning favorable outcomes were frequently attributed to internal factors and failure outcomes to external chance factors (Lau, 1984; Miller & Ross, 1975). They compared their scale with the MHLC Scale in a group of smokers. Alpha coefficients for the Smoking-Specific Locus of Control scale of 0.57, 0.51 and 0.64 on the low side were obtained for the Powerful Other, Chance and Significant Other scales; however, the Internality Scale had a low internal of 0.33. Internality and Chance factors did not discriminate from each other. To improve the psychometric properties of the scale, the unsatisfactory items were removed and the Internal and Chance dimensions were combined. The final scale consist of a combined Internal-Chance factor (ICSLC), with negatively loaded internal items and two positively loaded chance items: Significant Other factor (SOSLC), containing four items, and a Powerful Others factor (POSLC), containing three items. The alpha coefficients for the revised scale were 0.63, 0.55, and 0.56 for the Internal-Chance, Powerful Others, and Significant Others factors, respectfully. The alpha coefficient for the Significant Other factor was reduced when the scale was shortened. These three factors: Internal-Chance, Significant Others and Powerful Others, account for 19.7%, 18.4%, and 12% of the variance in smoking behavior, respectively. They found that the Smoking-Specific Locus of Control Scale provided better discriminate validity than the
MHLC Scale for smokers. Suspecting that their MHLC tool may not be sensitive for identifying internal-external attributes of smokers, Wallston and colleagues tested their MHLC tool on smokers. Their research findings showed the MHLC could be used with smokers (personal email correspondence with Wallston, K.A., 2001). Thus, research on locus of control of smokers suggest that a smoking specific or health specific measurement scale provides better outcomes compared to a generalized I-E scale.

4. Locus of Control and Smoking During Pregnancy

The studies using the various locus of control scales in pregnant women who smoked produced mixed results (Desmond, Price, & Losh, 1987; Kruse, Zweig, & LeFever, 1988). Desmond, Price, and Losh (1987) used the MHLC Scale and 12 statements on factors affecting pregnancy. Chance locus of control was significantly greater for smokers than nonsmokers and ex-smokers. Only two of the 12 statements proved to be significantly different for the three groups (p < .05). Smokers more frequently disagreed with the statement “If I have an unhealthy baby at birth it will be because I did not do something I should have done” (M = 3.5, SD = 1.8) compared with ex-smokers (M = 2.4, SD = 1.6) and nonsmokers (M = 2.5, SD = 1.6). Ex-smokers were more likely to disagree with the statement “Having an unhealthy baby at birth usually occurs just by accident” (M = 3.2, SD = 1.3) as compared to nonsmokers (M = 2.4, SD = 1.3) but not to smokers (M = 2.9, SD = 1.6). (p. 393). Again, the MHLC Scale did not show differences for pregnant women and smoking status. In the study conducted by Kruse, Zweig, and LeFever (1988), the powerful other locus of control measure (using the MHLC Scale) was associated with some of the social and demographic variables tested as well as with several health-related behaviors in pregnancy. There was no
association between internal locus of control and health facilitating behaviors of pregnancy.

Lindqvist and Aberg (2002) investigated how locus of control varied for those who stopped smoking and those who continued smoking in pregnancy. They used Georgiou and Bradley’s Smoking-Specific Locus of Control Scale in a group of 102 pregnant women. The researchers found borderline significance in locus of control between those who stopped smoking (median = 4.5) and those who continued to smoke (median = 3.8) (p = 0.09) during pregnancy. They concluded that more pregnant women who stopped smoking had higher locus of control (scores of 4.5 versus 3.8) than those who continued smoking. This was the case for both light and heavy smokers. There was also no correlation between the gestational week of ceasing smoking and locus of control, or between locus of control and participant’s expired CO air, an indicator of current smoking. (Caution should be used when interpreting the locus of control scores as the median and not the mean was used.) It can be concluded that means were not used because the data violated assumptions for parametric test.

In light of the mixed findings on the predictive value of locus of control for smoking, it appears that the Smoking-Specific Locus of Control Scale (Georgiou & Bradley, 1992) has not been extensively studied to conclude no predictive value. To date there are no studies utilizing this tool in combination with attributional styles to study pregnant women’s smoking habits from the social learning and attribution prospective, so one cannot conclude the smoking specific Locus of Control Scale tool does not produce significant results for this group of smokers.
D. Summary

The research related to attributions and health and smoking have produced varied results, frequently due to a conscious or unconscious decision to ignore one or more of the causal dimensions. The traditional dimensions of locus, stability, and controllability, although useful in the prediction of behavior, are not necessarily relevant to the prediction of smoking behaviors during pregnancy. Perhaps explanatory styles with dimensions of locus, stability, and globality are better measures of causal attributions for women during the transitional period of motherhood which at times may be perceived as a "helpless or hopeless" situation (Seligmen, 1998).

The research findings for locus of control have been no different; in fact, in many instances they have not provided greater clarity of the role LOC plays in smokers. Locus of control studies have lent themselves to mixed results regarding the predictive power of the currently used measurement scales. One explanation for the inconsistent findings is that individuals could hold a variety of inconsistent beliefs about the source of their control and the different aspects of smoking, health, and disease (Burgess & Hamblett, 1994). Perhaps locus of control cannot be measured in isolation from other aspects of personality traits such as optimism and pessimism, to produce meaningful insight into smoking behaviors. To date no one has studied the combined concepts of attributional styles and locus of control. If both constructs are orthogonal they may require being studied in combination (i.e., the interaction between LOC and attributional styles) to produce a more meaningful predictive outcome for pregnant women who quit or reduce the amount they smoke during the prenatal period.
CHAPTER 3

METHOD

This study compared maternal perception of causality, stability, and globality and locus of control to determine if personality traits varied among quitters and reduced smokers during the prenatal period. This chapter includes a discussion of the research design, sample, data collection and data analysis used in this study.

A. Research Design

This descriptive cross-sectional study identified quitters and reduced smokers who were six weeks to eight months gestation as the criterion variable and attribution styles and locus of control as the predictor variables (independent variables). The data were collected using a self-report questionnaire at two time periods in the study: (1) during the prenatal period (between six weeks and eight months of pregnancy) and (2) at six weeks-to-three months postpartum. Comparisons were made between the quitters and reduced smokers on attributions and locus of control variables.

B. Definition of Terms

Key terms used in this dissertation, are operationally defined below.

1. Locus of Causality

Locus of causality is the explanation given regarding the cause or causes of events. In this study, it refers to the perceived cause(s) of quitting or reducing smoking during pregnancy.

Personal causation refers to the perceived causal experience for quitting or reduced smoking. The experience of personal causation is equated with an internal locus
of causality while experiences of causation outside the realm of the individual are equated with an external locus of causality. In other words, the origin of the cause is viewed either as coming from within or outside of the individual. Personal causation was assessed by participant's responses to the Attributional Style Questionnaire which measures the dimensions of causality, stability and globality (Peterson, Semmel, Von Baeyer, Abramson, Metalsky, & Seligman, 1982).

2. Locus of Control

According to social learning theory (Rotter, 1966), locus of control orientation can be internal, external, or bilocal and is determined by the participant's score on the Smoking-Specific Locus of Control Scale (Georgiou & Bradley, 1992). Scores in the lower third of the scale (1-3) were categorized as internal and the highest third (5-) of the scale as external. The bilocal score are those at the mean (3.5-4.5).

3. Prenatal Period

The parameter for the prenatal period is that time period from the time a woman finds out she is pregnant to the eighth month of pregnancy.

4. Quitter

“Quitters” are women who smoked prior to pregnancy but quit before or by the eight month of pregnancy and did not smoke prior to delivery.

5. Reduced Smoker

“Reduced smokers” are pregnant women who decreased the number of cigarettes smoked per day in comparison to rates prior to pregnancy.

C. Sample Size/Power Calculation

The study design consisted of two groups of pregnant women who either quit or
reduced their smoking by the eighth month of pregnancy. Participants were recruited from the University Medical Center (UMC), the Clark County outpatient women’s clinic located in Las Vegas, Nevada. Based on Cohen’s (1988) estimation of a medium effect size ($f=25$), power=80%, and alpha=0.05, for correlational studies, the sample size should have been set at $N=177$. However, several investigators have consistently found significant correlations in similar populations utilizing a sample size of $N=99$ (Peterson, Seligman, & Vaillant, 1988; Peterson, Villanova, & Rap, 1985; Sweeney, Anderson, & Bailey, 1986). Due to studies with smaller sample sizes obtaining significant correlations, this study’s sample size was $N=110$.

D. Sample Selection

To obtain the participants for this study, pregnant women of childbearing (ages 15-44 years-old), who had scheduled prenatal appointments at the UMC Women’s Clinic, were invited to participate in the study. Indigent pregnant women are referred to this agency by other organizations in the valley when they require prenatal care and have no medical insurance. In addition, the clinic has a large Medicaid patient population. This population was chosen because more women from lower socioeconomic levels smoke and very little is known about their attributional styles and smoking.

1. Initial Contact With Potential Participants

Initial contact with potential participants occurred during patients’ routine prenatal clinic visit. While the women were being triaged at the nurse’s station they were queried about smoking status by the nursing staff. If a woman answered this question in the affirmative (quit smoking in pregnancy or currently reduced amount smoked) she was invited to participate in the study. Since the women were at varying
points of pregnancy, if they agreed to participate they were asked three questions to qualify them for the study, including: (1) are they still smoking, (2) have they decreased the amount they smoke daily (for those who still smoked) and (3) their gestation. Participants who either stopped smoking (quitters) or reduced the amount they smoked (reduced smokers) before the eighth month of pregnancy were invited to take part in the study. All participants were given both verbal and written informed consent information, emphasizing voluntary participation and confidentiality. They were told they would be contacted by the research assistant (graduate nursing student) to complete the study questionnaires. A mutually agreed upon time and date was established to contact them by telephone to collect the first set of data. They were also informed that the research assistant would contact them by telephone sometime after the sixth week postpartum to obtain the second set of data.

E. Inclusion/Exclusion Criteria

To eliminate threats to internal validity, inclusion and exclusion criteria were used to select participants. The inclusion criteria included: (1) healthy women who were not diagnosed with conditions associated with the complications of pregnancy, (2) women of childbearing age, (3) willing to participate in this study, (4) stopped or reduced the amount they smoked by the eighth month of pregnancy and (5) spoke English. Individuals were excluded from the study for: (1) a diagnosis of cardiovascular, renal, pulmonary, neurological or metabolic diseases, (2) a diagnosis of an overt psychiatric illness including depression and/or diagnosis of panic attacks, and (3) if they took any medications for a chronic illness.
F. Instrumentation

The research instrument used in this study was a self-report questionnaire consisting of scales to measure attributional styles and locus of control (see Appendix A). In addition, demographic data, past/present smoking history, and postpartum smoking patterns were obtained. The Beck Depression Inventory was administered to control for prenatal and postpartum depression.

1. Attribution Styles Questionnaire

This scale was developed by Peterson, Semmel, von Baeyer, Abramson, Mmtalsky, and Seligman (1982) to measure attributional styles which identifies both optimistic and pessimistic explanatory styles (diathesis-stress model). Thus a person in a situation of success may make stable, global and internal causal attributions which reinforce desirable outcomes, while unstable, specific, external causes reinforces failure conditions. The original questionnaire contains 12 hypothetical situations, six positive and six negative, measuring three dimensions of attributions: locus of causality, stability, and globality. Six of the questions relate to interpersonal/affiliation and six are achievement related. There are four responses per situation. In part one of each situation participants were asked to imagine the hypothetical situations happening to them and provide their own causal explanation for each hypothetical situation (e.g., “You give an important talk in front of a group and the audience reacts negatively.”). While these descriptive answers did not directly contribute to the measurement of the three dimensions (they are not scored) they provided greater insight into the participant’s causal explanations. Participants were then asked to provide a response on a 7 point rating scale for each of the remaining three sections of each hypothetical situation which
addressed the internal-external, unstable-stable, and specific-global dimensions of explanatory styles, respectively. The positive situations range from a high of 7 and a low of 1 and the range for negative situations are in reverse order. The questionnaire was read to each participant who then provided an answer.

The scales are weighted such that external, unstable, and specific attributions receive lower scores (optimistic), and internal, stable, and global attributions receive higher scores (pessimistic). On the negative dimension low scores are more optimistic and high scores more pessimistic, while on the positive dimension low scores are more pessimistic and high scores are more optimistic. Scoring was done as follows: for positive situations, a composite positive attributional style (CoPos) score was obtained by summing the total of all positive situations scores and dividing by the total number of positive situations. For the negative situations, a composite negative attributritional style (CoNeg) score was obtained by summing the total of all negative situations scores and dividing by the total number of negative situations. For example, to obtain a positive composite score the best score is 7 multiplied by 3 questions per situation multiplied by 6 situations then divided by 6 positive situations equals 21. To obtain a composite score for all events the composite positive minus composite negative (CPCN) was computed by subtracting the lowest scores 3(highest CoPos) - 21 (lowest CoNeg) = -18 and the highest scores 21 (highest CoPos) – 3 (highest CoNeg) = 18, making the range of scores for CPCN -18 to 18. The negative score (-18) is more pessimistic and the positive score (18) is more optimistic. The overall composite score measures the overall explanatory style, optimism or pessimism.
2. **Smoking-Specific Locus of Control Scale**

Locus of control was tested separately from locus of causality since both are felt to be orthogonal to each other based on the perspective of attribution theory. The Smoking-Specific Locus of Control Scale developed by Georgiou and Bradley (1992) (see Chapter 2 for discussion of validity and reliability) was used since it has been suggested that individuals hold a variety of inconsistent beliefs about the source of control depending on what aspect of health and disease are being questioned (Georgiou & Bradley, 1992). Additionally, it was felt that the MHLC Scale measured locus of control for general health beliefs which is sometimes a poor predictor of smoking behaviors. The Smoking-Specific Locus of Control scale is 11-item Likert scale requiring participants to make forced choices for each statement (Georgiou & Bradley, 1992). The scale ranges from answer choices “strongly disagree” (0) to “strongly agree” (5). Seven statements are worded in the external orientation (statements 1, 3, 6, 7, and 10) and four items are internally worded (statements 2, 4, 5, 9, and 11). All statements assess some issue or aspect of cigarette smoking. An example of an internally oriented statement is “If I want to stop smoking, I've got to make it happen myself”, and an externally oriented statement is “If I fail to stop smoking, it's because the people closest to me didn’t help me enough.” Overall scoring was determined by comparing the average score of the “internal” and “external” locus questions. If “internal” score was greater than the “external” score the participant was considered to have an internal locus of control. The overall scores were obtained by coding each participant’s average scores for internal and external questions as follows: 0-1.5=internal; 1.6-3.5=bilocus; and 3.6-5=external for external questions and 0-1.5=external, 1.6-3.5=bilocus, and 3.6-5=internal for internal
questions. The following combinations of possible coded groups were: true internal=I/I, true bilocus=B/B, true external=E/E, mixed internal=I/B or B/I, mixed external=E/B or B/E, and undecided=I/E or E/I.

3. **Beck Depression Inventory**

This measurement tool is a 21 item self-report inventory which has been used extensively to identify individuals with depressive symptoms. The Beck Inventory has adequate reliability, with a mean coefficient alpha of 0.81 for nonpsychiatric individuals (Beck, Steer, & Garbin, 1988). The basic scoring (according to the BDI-II manual) was based on the following coding of answers for each participant: minimal depression=0-13 points, mild depression=14-19 points, moderate depression=20-28 points, and severe depression=29-63 points. Prenatal-postnatal depression score comparisons were also made for the 64 postpartum participants who provided this data. Scoring was done to compare prenatal-postpartum changes in depression categories (minimal, mild, moderate, and severe). The relative frequencies for change were calculated as a percentage of the total number of time-two response available (quitters: n=33; reduced smokers, n=19).

4. **Demographic Data**

Studies cited in the literature review indicate several demographic variables that predict smoking behavior (Cnattingius, 2004; Ebrahim, Floyd, Merritt, Decoufle, & Holtzman, 2000; Mullen, Pollak, & Kok, 1999; Solomon & Quinn, 2004). Highest level of education was obtained since this variable is a good predictor for women who quit versus those who reduce their smoking (Lu, Tong, & Oldenburg, 2001; Ockene, et al, 2002; Paterson, Meimanis, & Bain, 2003; Severson, Adrews, Lichtenstein, Wall, &
Zoref, 1995). Other demographic data included: age, parity, employment status, marital status, and ethnicity.

5. Patterns of Smoking Assessment

Two sets of items assessing whether pregnant women stopped or reduced smoking were developed by this author based on the literature (Berman & Gritz, 1991; Floyd, Rimer, Giovino, Mullen, & Sullivan, 1993; Hutchison, Stevens, & Collins, 1996; Lindqvist & Aberg, 2001; McBride & Pirie, 1990). Questions for both sets of items were similar with the exception of questions directed at current smoking status. Items assessed include: time period in pregnancy participant quit or reduced smoking, why the change in smoking behavior, knowledge about the effect of smoking to the unborn infant, amount smoked prior to behavior change, time of day smoked the first cigarette prior to behavior change, the perceived effect of environmental smoke on infant, received information about smoking in pregnancy, planned infant feeding method, significant other/other members in the household smoke, and perception of self as smoker or nonsmoker.

Questions specifically posed to the quitters included: method of quitting during pregnancy and confidence to remain abstinent. Quitters were also asked open-ended questions regarding identification of triggers which elicited the desire to smoke. The reduced smokers also were asked specific questions which were not posed to the quitters, which included: number of cigarettes smoked per day during pregnancy and confidence to be able to quit in the future. The reduced smokers were also asked the same open-ended questions regarding identification of triggers to smoking. In addition, they were
asked to provide a short answer to how they felt about not being able to fully quit smoking in pregnancy (See Appendix A).

6. Postpartum Patterns of Smoking Assessment

This tool was developed by this author based on research findings in the current literature review. The same tool was used for both quitters and reduced smokers. The variables assessed included: birth weight and status of newborn, infant feeding method implemented, individuals who smoke in the home, and postpartum smoking status. If quitters and reduced smokers responded that they relapsed or increased the amount they smoke, they were asked to provide the number of cigarettes they currently smoke and was the amount less than, the same as, or more than the amount smoked prior to this pregnancy. Participants were asked to provide a short answer as to the reason they relapsed or increased their smoking rate. They were also asked to rate their confidence level for maintaining abstinence or reduced smoking status by providing a number from 0 (no confidence) to 100 (very confident). See Appendix A for the measurement tools used in the study.

G. Procedures

Originally, data collection was to be conducted at the time participants agreed to take part in the study. However, the patient flow through the clinic was disrupted due to the length of time it took participants to complete the questionnaires. Some of the participants also decided to drop out of the study after beginning to answer the Attributional Style Questionnaire stating that the questionnaire was too difficult to complete. Additionally, patients identified as potential participants by the nurses could not be invited into the study when the researcher was not present at the clinic. For these
reasons, the data collection method was changed to contacting potential participants via telephone. At the time and date participants identified as mutually convenient, the participants received a phone call to collect the first set of data. The data collected at time one included: the Attribution Style Questionnaire, Smoking-Specific Locus of Control Scale, Beck Depression Inventory, demographic data sheet and Patterns of Smoking Assessment. Before data collection commenced, the participants were asked to confirm their smoking status. Once individuals qualified, they were asked if they were given informed consent information in the clinic prior to the time one telephone contact. If not, informed consent was obtained over the phone prior to data collection. They were also reminded about the second phone call to collect time two data sometime after the sixth postpartum week. This process continued until data for 110 participants were obtained.

1. Human Subjects Review Consideration

The study, Attributional Styles of Women who Quit or Reduce Smoking in the Antepartum was approved by UMC’s IRB committee and Loma Linda University’s IRB concurred. Participants who agreed to enter the study were given verbal and written information (ICD) about the study purpose and procedures by the clinic nurses. In order to avoid the issue of a breach in confidentiality only the researcher had access to the master list of participants’ names. The data were entered into the data bank void of participant names and any informational data linked to participants was destroyed once the postpartum data were collected. The compilation of data in this manner made it impossible to identify individual participants after data collection was completed. All data, including the master list of participants’ names, were kept in a locked file cabinet in the researcher’s office and will be destroyed after a period of three years.
2. Refinement of the Measurement Tools

The Patterns of Smoking Assessment questionnaire for quitters and reduced smokers were reviewed by two individuals identified as experts in the area of smoking. These individuals critiqued the questionnaires for content validity, and asked whether the response choice to each question was representative of the range of choices most likely to be chosen by the participants. Based on their recommendations, revision of the measurement tools were made accordingly.

3. Method of Data Collection at Time One (Between Six and 36 Weeks Gestation)

Those who qualified and agreed to participate in the study were asked to complete the following: (1) Attributional Style Questionnaire (2) Smoking-Specific Locus of Control Scale, (3) Patterns of Smoking Assessment, and (4) the demographic data sheet. The Beck Depression Inventory was also administered as a baseline indicator of depression for each participant. All five questionnaires were administered at the time participants enrolled in the study. A research assistant who received training on administering the questionnaires collected study data along with the investigator.

Participants received explicit instructions on how to answer each item on the questionnaire. They were also told there is no right or wrong answer and that they should answer each item as honestly as possible. Additionally, if participants came upon a question or questions they were having difficulty answering they were told to choose the answer that they most strongly agreed with. Participants were also asked to provide an estimated date of delivery, which was then noted on the questionnaire.
4. Data Collection at Time Two (Six Weeks to Three Months Postpartum)

Telephone contact by the research assistant was made to all participants according to the estimated time of delivery given to the researcher at initial contact. If the phone call was at an inopportune time, another time and date mutually identified by the research assistant and participant was established. Then the second set of data was collected over the phone. Participants were asked to respond to questions on the postpartum questionnaire. In addition, participants were asked to complete the Beck Depression Inventory (a good indicator for depression) which identified the presence of postpartum depression. Infant’s birth weight and infant health status were used as an indirect way to correlate self reported information of smoking abstinence or sustained reduction throughout pregnancy since cotinine levels were not obtained to validate self-reported smoking status. This indirect measure of maternal self-reported smoking is supported by Lawrence, Aveyard, and Croghan (2003) and Ventura, Hamilton, Mathews, and Chandra (2003).

The same protocol used at Time One for administering the measurement tools were followed at Time Two. The participants were thanked for their willingness to take part in the study. A week later a $10.00 gift certificate to ToysRUs was mailed to them for their participation. The results of the Time Two data collected (postpartum data) is incomplete because not all 110 participants have given birth by the end of the study period. Ongoing data collection will be conducted and the final data analysis will be reported at a later date. The cross-sectional data from Time One is presented in the dissertation.
H. Data Analysis

Content analysis was used to analyze the responses made to the open-ended questions for common themes given by the responders. Data entry and analysis were done utilizing the Statistical Package for the Social Sciences (SPSS), Version 12.1 software program for frequency analyses, SAS (version 8.0) was used for all other statistical analysis and AXUM (version 7.0) to develop the graphics.

To test the research questions on causal attributions and locus of control for quitters and reduced smokers, Chi-square analyses were performed. The Smoking-Specific Locus of Control Scale results were recoded to assess internal, external and bilocus of control. Those who scored extremely high on the external locus of control measure were considered addicted smokers (Bunch & Schneider, 1991). Quitters were hypothesized to be more likely to make internal, stable, and specific attributions and have a bilocal locus of control.

Additionally, descriptive analysis using frequency distributions, percentages and measures of central tendencies were performed for the following variables: maternal age, ethnicity, parity, numbers of years as a smoker, number of cigarettes smoked prior to quitting/reducing smoking in the prenatal period, intentions to stay quit or to quit, and number of family and friends that smoke. It was expected that the demographic and smoking history variables, which have shown predictive utility in previous studies, would also show significant findings for this study. The demographic variables expected to be associated with prenatal smoking status include: age, parity, marital status, and education. Reduced smokers were expected to be: younger, have fewer children, single, and have less educated. In addition, it was expected that women who quit smoking during
the prenatal period smoked fewer cigarettes per day (10 or less cigarettes per day), and did not smoke immediately upon awakening in the morning.
CHAPTER 4

ATTIBUTIONAL STYLES AND LOCUS OF CONTROL BETWEEN WOMEN WHO QUIT Versus REDUCE SMOKING DURING PREGNANCY

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Abstract

Background: Researchers have sought to identify variables associated with pregnant women who stop or continue to smoke. However, many variables are demographic in nature and very little is known about psychological variables associated with those who quit or reduce their smoking rates.

Objective: To analyze attributional style and locus of control to determine which factors alone, or in combination, are associated with quitting versus reduced smoking.

Method: Pregnant smokers who quit (n=66) or reduced their smoking (n=43) were identified by the nursing staff at a women’s county out-patient clinic in Las Vegas and interviewed by telephone between March 2002 and August 2004. Subjects completed measures of attributional styles and locus of control and smoking habits prior to and during pregnancy. The Beck Depression scale was administered to control for depression.

Results: Both groups had similar attributional styles, which were pessimistic (below the midpoint of zero on the scale of -18 to +18), however, quitters were less pessimistic than reduced smokers (reduced smoker: -3.4, quitter: -1.7, p≤0.001). There were no differences in locus of control between the two groups, most in each group internal locus of control. Compared to reduced smokers, quitters were younger (median=22 vs. 26, p=0.036) and less likely to live with a smoker (56.7% vs. 72.1%, p≤0.001). More quitters stopped at <2 weeks (28.8%) or 1-2 months (40.9%) of being pregnant compared to reduced smokers who were more likely to change their smoking habits at 1-2 months (41.9%) or 3-4 months (37.2%) into pregnancy (p≤0.001). There were no differences between groups on education, ethnicity, marital status, parity, or smoking prior to pregnancy. Depression was not associated with smoking status.
Conclusions: Reduced smokers were more pessimistic, especially for internal causality for negative situations, which indicates a personality difference between groups. This suggests attribution therapy may be effective for reduced smokers to encourage them to quit completely.

Medical Subject Headings (MeSH): pregnancy, reduced smoker, attributions, optimism, pessimism, locus of control.
Introduction

There is mounting evidence that cigarette smoking during pregnancy significantly increases the risk for spontaneous abortion, perinatal death, stillbirth, and low birth weight.\(^1\) Additionally, there is a direct link between smoking and abruption placenta, bleeding during pregnancy, premature rupture of membranes, amnionitis, preeclampsia and preterm delivery.\(^2\)\(^-\)\(^5\) The risk for spontaneous abortion is 30% to 70% greater for pregnant women who smoke.\(^6\)

The harmful effects of smoking during pregnancy bears intense social pressure on women to quit.\(^7\) In spite of this, between 50% to 70% of women smoke throughout their pregnancies.\(^8\) However, one-half of pregnant smokers decrease the number of cigarettes smoked daily as a risk-reduction strategy,\(^9\)\(^-\)\(^11\) 10 cigarettes being the mean number smoked per day among such women.\(^12\) Women who continue to smoke during pregnancy are more likely to be single as compared to quitters, who are more frequently married.\(^13\)\(^14\) Additionally, they are more likely to have an unplanned pregnancy,\(^15\) have difficulty establishing regularity and stability in their daily lives, display reckless behavior,\(^11\) and consume greater amounts of coffee (more than three cups per day),\(^15\),\(^16\) alcohol and tea.\(^17\)

Ruggiero, et al\(^18\) examined smoking attitudes of pregnant and nonpregnant women and found smoking attitudes to be more polarized in those who were pregnant. That is, pregnant women are either more motivated to quit or more fixed in their intention to continue smoking than nonpregnant women. Curry, et al\(^19\) found that at the beginning of pregnancy women are more motivated to quit smoking than later on. As the pregnancy progressed, motivation levels decreased in women who fail to quit smoking. They concluded that the salience of concern for a healthy pregnancy diminishes as the
pregnancy progresses. Bennett and Clatworthy found that women who continued smoking during pregnancy thought smoking to be less harmful than those who quit. The women who continued to smoke in this study thought that smoking results in smaller babies, making child birth easier.

Very little is known about the attributional styles of pregnant smokers who quit or reduce smoking during the prenatal period. Differing personality traits (optimism versus pessimism and a bilocus of control) might influence pregnant women’s decision to quit or reduce smoking during the antepartum period. Cross-sectional studies identifying determinants of smoking or smoking cessation in pregnancy describe demographic data, and other factors such as having a significant other who smokes, depression in pregnancy, nicotine dependence, and increased stress.

This study examined the attributional styles, specifically optimism and pessimism, and locus of control, in pregnant smokers who quit versus those who reduced smoking to determine if there are differences between the two groups. Depression was measured to identify if this potentially confounding variable was associated with smoking status since depression is frequently associated with both pregnancy and smoking.

Method

Study Design

In this cross-sectional study, telephone surveys were conducted with pregnant smokers who quit smoking (quitters) or reduced smoking (reduced smokers) during the prenatal period. Women invited to participate in the study were contacted after they were identified by the nursing staff at the University Medical Center out-patient Women’s
Clinic, a county health facility in Las Vegas, Nevada. This facility provides obstetrical and gynecological services to a large number (75%) of indigent women who have no medical insurance or are covered by Medicaid. The data collection period took place between March 2002 and August 2004. Participants were eligible to be interviewed if they were healthy pregnant women who did not have a diagnosed condition associated with the complications of pregnancy, were willing to participate, stopped or reduced the amount they smoked by the eighth month of pregnancy, and spoke English.

Survey Instruments

The research instruments used in this study were self-report questionnaires to measure attributional styles and locus of control. In addition, demographic data and past/present smoking history were obtained. The Beck Depression Inventory was administered to control for prenatal depression.\textsuperscript{21,22}

1. Attribution Styles Questionnaire: identifies both optimistic and pessimistic explanatory styles. The questionnaire contains 12 hypothetical situations, six positive and six negative, measured on three dimensions: locus of causality, stability, and globality. There are four parts to this questionnaire. In part one, participants were asked to explain the cause for each hypothetical situation (e.g., “You give an important talk in front of a group and the audience reacts negatively.”). These responses provided greater insight into the participant’s perception of the cause for the situation. Parts 3, 4, and 5 of the questionnaire yielded scores for the explanation of the six positive and six negative events for the three dimensions: internal/external, stable/unstable, and global/specific causes. The positive situations range from a high of 7 and a low of 1 and the range for negative situations are in reverse order. The scales are weighted such that external,
unstable, and specific attributions receive lower scores (optimistic), and internal, stable, and global attributions receive higher scores (pessimistic). On the negative dimension low scores are more optimistic and high scores more pessimistic, while on the positive dimension low scores are more pessimistic and high scores are more optimistic. Scoring was done as follows: for positive situations, a composite positive attributional style (CoPos) score was obtained by summing the total of all positive situations scores and dividing by the total number of positive situations. For the negative situations, a composite negative attributritional style (CoNeg) score was obtained by summing the total of all negative situations scores and dividing by the total number of negative situations. For example, to obtain a positive composite score the best possible score would be 7 multiplied by 3 questions per situation multiplied by 6 situations then divided by 6 positive situations which would equal a score of 21. To obtain a composite score for all events the composite positive minus composite negative (CPCN) was computed by subtracting the lowest scores 3 (highest CoPos) - 21 (lowest CoNeg) = -18 and the highest scores 21 (highest CoPos) - 3 (highest CoNeg) = 18, making the range of scores for CPCN -18 to 18. The negative score (-18) is more pessimistic and the positive score (18) is more optimistic. The overall composite score measures the overall explanatory style, optimism or pessimism.²⁴

2. Smoking-Specific Locus of Control Scale: was used to measure locus of control separately from locus of causality since both are felt to be perpendicular (somewhat related but not the same) to each other according to the perspective of attribution theory.²⁵,³⁴ The Smoking-Specific Locus of Control Scale²⁶ was used since it was specific to the behavior. The Smoking-Specific Locus of Control scale is an 11-item
Likert scale (0-5) requiring participants to make forced choices for each smoking statement. Seven statements are worded in the external orientation, and four items are internally worded. The scale ranges from answer choices "strongly disagree" (0) to "strongly agree" (5). Seven statements are worded in the external orientation (statements 1, 3, 6, 7, and 10) and four items are internally worded (statements 2, 4, 5, 9, and 11). All statements assess some issue or aspect of cigarette smoking. An example of an internally oriented statement is "If I want to stop smoking, I've got to make it happen myself" and an externally oriented statement is "If I fail to stop smoking, it's because the people closest to me didn't help me enough." Overall scoring was determined by comparing the average score of the "internal" and "external" locus questions. If "internal" scores were greater then the "external" score the participant was considered to have an internal locus of control. In addition to the standard procedure of scoring the smoking locus of control scale (as stated above) the author recoded the scale to measure bilocus of control as well as internal and external loci. According to Wong and Sproule (1984) bilocals may perform better than highly internal controllers, especially when success of a task is determined by both internal and external factors. The overall scores were obtained by coding each participant's average scores for internal and external questions as follows: 0-1.5=internal; 1.6-3.5=bilocus; and 3.6-5=external for external questions and 0.-1.5=external, 1.6-3.5=bilocus, and 3.6-5=internal for internal questions. The following combinations of possible coded groups were: true internal=I/I, true bilocus=B/B, true external=E/E, mixed internal=I/B or B/I, mixed external=E/B or B/E, and undecided=I/E or E/I.
3. **Beck Depression Inventory**: is a 21 item self-report inventory used extensively to identify individuals with depressive symptoms. The Beck Inventory has adequate reliability, with a mean coefficient alpha of 0.81 for nonpsychiatric individuals. It was included in order to determine if smoking is related to depression. The basic scoring (according to the BDI-II manual) was based on the following coding of answers for each participant: minimal depression=0-13 points, mild depression=14-19 points, moderate depression=20-28 points, and severe depression=29-63 points.

4. **Demographic Data**: predictive of smoking behavior based on previous studies were collected including age, parity, employment status, marital status, and ethnicity. Highest level of education was obtained since this variable is a predictor for women who quit versus those who reduce their smoking.

5. **Patterns of Smoking Instrument**: was developed by the authors based on the current smoking literature. The variables assessed included smoking history prior to smoking cessation or reduction in the prenatal period, age started smoking, number of cigarettes smoked per day, time of day smoked the first cigarette, number of years as a smoker, significant others who smoke, interventions received to stop smoking during pregnancy, and perception of self as smoker. In addition, reduced smokers were asked feelings related to current smoking status, number of cigarettes currently smoking, and knowledge about the harmful effects of environmental smoke on the fetus.

Response Rates

A total of 148 pregnant women were invited to participate in the study. Twelve women were not interested in participating, three had miscarriages, and two did not speak English. An additional 20 participants could not be contacted because of disconnected or
incorrect telephone numbers. The incorrect telephone numbers were rechecked using the patient data information provided to the clinic by the participants before classifying them as “lost potential participants”. Out of the original 149, a total of 109 pregnant women (73.65%) participated in the study: 66 (44%) were classified as quitters and 43 (29%) were identified as reduced smokers.

**Data Analysis**

Data entry and analyses were done utilizing the Statistical Package for the Social Sciences (SPSS), Version 12.1 software program to obtain frequencies and other descriptive statistics, and SAS (version 8.0) was used for all other statistical analyses. To test the association of causal attributions and locus of control for quitters and reduced smokers, chi-square analyses were performed. Chi-square was used to analyze the association between smoking status and degree of depression.

Additionally, descriptive analysis using frequency distributions, percentages and measures of central tendencies, were performed and comparisons made with Chi-Square and Mann-Whitney analyses between quitters and reduced smokers on the following variables: maternal age, ethnicity, education, parity, number of cigarettes and timing of the first cigarette smoked upon awaking in the morning prior to pregnancy, and living with a smoker, knowledge of the effect of smoking to the unborn infant, and the intention to breast or bottle feed. A general loglinear model was used to examine quitters and reduced smokers and method of feeding and the reason given for their changed smoking behavior during pregnancy.
Results

Demographic Characteristics

The study compared quitters and reduced smokers on age, ethnicity, education, marital/partner status, and the number of living children (full-term and preterm). See Table 1 for details. Overall, quitters were younger, with the median age being 22, while the median age for reduced smokers was 26. The Mann-Whitney U statistical analysis was performed on the variables for age ($U=1081, p=0.036$). This difference supports the idea that older smokers are more regular smokers and therefore, have a more difficult time quitting.

Caucasians comprised the largest ethnic group for both quitters and reduced smokers. Additionally, Hispanics were more likely to quit smoking compared to Caucasian participants ($p=0.003$). This ethnic difference was also found by Yu and Associates. A comparison of education levels for both groups showed the greatest number of individuals (quitters: 37.9%, reduced smokers: 27.3%) in both groups had at least a 12th grade education. Years of education completed was collapsed into the following categories: (1) less than high school, (2) completed high school, and (3) completed some college, found no significant difference in educational levels between quitters and reduced smokers.

Bother quitters and reduced smokers were most likely to be single (quitters: 42.4%, reduced smokers: 36.4%). If the individuals reported living with the baby’s father were combined with those who were married, more quitters (45.4%) than reduced smokers (34.8%) cohabitated, however; the finding had only borderline statistical significance ($p=0.056$). Forty-nine percent of quitters and 34% of reduced smokers were
experiencing their first pregnancy. This finding was marginally significant (p=0.054). For those who had a previous pregnancy, nine quitters reported having at least one premature baby and two of the nine also reported smoking during the pregnancy resulting in the premature birth. Two reduced smokers reported having a preterm delivery and one smoked during that pregnancy.

**Smoking and Pregnancy Related Factors**

There were a few significant differences between quitters and reduced smokers on smoking and pregnancy factors. The majority of quitters (p=0.001) were more likely to be lighter pre-pregnancy smokers (quitters: 42.4% smoked 1-5 cigarettes per day compared to reduced smokers: 11.6%) but there were no differences between groups on when subjects smoked their first cigarette after awakening in the morning. More women who quit smoking planned to breastfeed (69.7%) compared to reduced smokers (48.8%), who were likely planning to bottle feed their infants ($\chi^2=4.62$. d.f.=1, p=0.032).

Quitters (57.6%) were less likely to live with another smoker regardless of marital status ($\chi^2=2.67$. d.f.=2, p=0.026). When quitters and reduced smokers were analyzed by marital status, 31.8% of quitters and 27.9% of reduced smokers lived with a husbank or a significant other who also smoked. Among those who reported being single, separated or divorced, a significantly (p=0.024) larger percentage of reduced smokers (41.8%) reported living with a smoker when compared with quitters (19.7%).

Both groups changed their smoking behavior early in the pregnancy but, quitters stopped earlier at <2 weeks (28.8%) or 1-2 months (40.9%) of being pregnant compared
to reduced smokers who were more likely to change their smoking habits at 1-2 months (41.9%) or 3-4 months (37.2%) into their pregnancy.

Findings that were not statically significant included: concern for the health of the unborn infant as the reason most frequently given by both quitters and reduced smokers for their change in smoking behavior (quitters=71.2%; reduced smokers=62.8%, \( \chi^2=4.52, \) d.f.=3, p=0.210), the effects of cigarette smoke on the unborn child, quitters (56.1%), reduced smokers (65.1%, \( \chi^2=8.89, \) d.f.=5, p=0.113). Interestingly, 30.3% of quitters and 27.9% of reduced smokers felt that smoking during pregnancy lead to a nicotine addicted fetus, yet this belief did not motivate reduced smokers to quit completely. See Table 2 for details.

**Depression and Smoking Behavior**

The prevalence of depression measured by the Beck Depression Scale revealed the majority of quitters suffered from at least minimal depression (59.1% of quitters versus 40.9% of reduced smokers). Twenty-one percent of quitters (n=14) had moderate depression followed by 13.6% with mild depression and 1.5% were classified as having severe depression. Among reduced smokers, 25% reported experiencing mild depression while 18.2% and 13.6% reported moderate and severe depression, respectively. To determine if there was an association between depression and smoking status chi-square analysis (\( \chi^2=6.355, \) d.f. = 3, p=0.096) was performed and showed smoking status (quitter and reduced smoker) was independent of depression (See Table 3).

**Locus of Control, Attributional Style and Smoking Behavior**

*Locus of Control.* Both groups had a very high percentage of subjects with
internal locus of control (quitters: 93.8%; reduced smokers: 95.5%) as classified according to the cutoff scores described by Georgiou and Bradley. Their Smoking Locus of Control Scale had good discriminate validity when used to study ex-smokers and smokers as compared to the Multidimensional Health Locus of Control Scale (MHLC), a nonsmoking specific scale developed by Wallston and Wallston. However, Georgiou and Bradley modified the scale by eliminating scale items that had low alpha scores. The majority of individuals in both groups had internal locus of control scores in the initial data analysis so the investigator decided to reanalyzed the data by recoding the data according to the following categories: internal, external, bi-locus of control (see the method section for an explanation of recoding), with the expectation that quitters would be more likely to have bi-locus of control. Analysis of the recoded data revealed that the majority of quitters and reduced smokers were no longer ranked as having internal locus of control, meaning they did not score between 1.6-3.5 for internal locus of control and external locus of control questions. Instead the majority of quitters and reduced smokers had a mixed internal locus of control (quitters: 45% versus reduced smokers: 48.3%), with only 24% of quitters and 27.6% of reduced smokers having scores classifying them as having true internal locus of control. Even with recoding there were no true external locus of control individuals among quitters and reduced smokers, probably because participants in both groups had “successfully” changed their smoking behaviors.

Eighteen (27%) quitters and eight (18.4%) reduced smokers were classified as true bi-locals (scores which fell somewhere in the range of 1.6-3.5). Chi-square analysis ($\chi^2 = 1.94$, d.f. =3, p=0.585) revealed that locus of control was not associated with smoking status (quitters and reduced smokers) (See Table 4).
**Attributional Style:** The Attributional Styles Questionnaire (ASQ) was analyzed using the following categories: internal/external, stable/unstable, and specific/global. Three category scores were obtained by summing across all positive (CoPos) situation questions and three category scores were obtained by summing across all negative (CoNeg) situation questions. This analysis resulted in three positive and three negative scores for each attributional category. Next, one positive and one negative score were obtained by summing the three positive scores together and summing the three negative scores. Both positive and negative scores were then added together resulting in the composite positive, composite negative (CPCN) score to determine attributional styles (optimist versus pessimist) for quitters and reduced smokers. Both groups were more internal, stable and global in positive than negative situations (p<0.001), meaning they were more likely to attribute their success in smoking behavior change to their skills/abilities, which would continue over time and they viewed their success to other positive situations. (See Figures.1-2). When the total composite (CPCN) score (ranged from -18 to +18) was calculated, assuming equal variances (Levene’s Test: F=0.160, p=0.690), those that quit smoking were, on average, more optimistic than those that decreased smoking (Quitters: CPCN=-1.7; reduced smokers: CPCN=-3.4; t=-3.601, d.f.=95, p<0.001). Both groups tended to be negative or pessimistic (judging by their negative CPCN scores, but quitters were closer to the neutral score of 0, meaning they were more optimistic than reduced smokers. (See Table 5 for CPCN summary.) This suggests that both quitters and reducers tended to internalize negative situations more that positive ones, believing that negative situations are likely stable and global. The reliability for the three subscales of the ASQ (internal/external,
stable/unstable, and specific/global) ranged from .39 to .64 and thus had unsatisfactory reliability. However, when the composite scores were formed (see above for explanation), substantially higher and satisfactory levels of internal consistency were found with reliabilities of .64 for CoPos and .61 for CoNeg and .76 for CPCN according to Revick.

Knowing that the harmful effects of smoking and the feeding methods (breastfeeding versus bottle feeding) frequently influence smoking behavior change during pregnancy, a general loglinear model was used to examine these variables between groups (quitters and reduced smokers). Significantly more quitters planned to breastfeed compared to reduced smokers ($Z=2.115, p=0.034$). Of those planning to breastfeed their babies, significantly more quitters than reduced smokers were concerned about the effects of smoking on their unborn child ($Z=1.917, p<0.001$). When comparing these variables: feeding method and concern for the unborn infant with CPCN scores for both quitters and reduced smokers, there was only one significant difference found within groups in the reduced smokers group method of feeding ($F=5.87, p=0.021$). There were no differences for any of the variables for quitters. When a comparison was made between groups, quitters planning to breastfeed were the individuals who also had lower CPCN scores ($F=6.242, p=0.014$). However, there were no significant differences between CPCN scores and concern for the health of the unborn infant for both quitters and reduced smokers ($F=1.00, p=0.397$).

**Discussion**

This study examined attributional styles of pregnant women who quit or reduced smoking in the prenatal period. There was only one difference in attributions between
groups on the composite score, which indicated that reduced smokers were more
pessimistic than quitters, although quitters were also slightly pessimistic. The results of
this study, therefore, supported the notion that optimistic-pessimistic attributional styles
differed for those who chose to quit or reduce smoking during pregnancy. According to
Seligman33 optimists and pessimists utilize different attributional styles to explain
negative events or failure such as not being able to quit smoking during pregnancy.
Optimists are individuals who view a negative event as a temporary situational setback
that is not their fault. Pessimists, on the other hand, see a negative event as long-lasting,
potentially undermining large portions of their lives and use self-blame as the cause.
Based on this description, one would expect pregnant women who reduced their smoking
to have attributional styles that are internal, stable, and global for negative situations and
quitters to have external, unstable, and specific attributions; however, this was not
supported by the findings in this study. One explanation for this similarity between
quitters and reduced smokers is that both groups were too similar in terms successfully
modifying their smoking behavior. Perhaps comparing reduced smokers with
nonsmokers would have produced statistically significant differences.

When locus of control is viewed from a bilocal perspective, 34 an individual’s
locus of control can be located anywhere within a two-dimensional space of internal and
external control, thus individuals with bi-locus of control can foster greater adjustment. 34
The idea that individuals, specifically pregnant smokers, who have a balanced locus of
control (bi-local) are more likely to quit smoking versus reduce smoking, was not
supported by this study, possibly because of a very high internal locus of control rate in
this study population, which seems somewhat contrary to other studies of low income women.

An examination of the demographic data did not support the findings of the independent correlates of quitting identified in other studies of pregnant smokers. This outcome is probably due to the fact that not much is known about the pregnant smoking habits of women who come from lower socio-economic backgrounds. In addition, pregnant women who reduce smoking have also not been studied extensively. The only variables which differed significantly for quitters and reduced smokers were age and ethnicity. Those who quit smoking in the antepartum were younger (median=22) than those who reduced smoking (median=26). Hispanics (30.3%) were more likely to be quitters (30.3%) than reduced smokers (4.5%) while more Caucasians were likely to be reduced smokers (75%) than quitters (37.9%). In a study by Yu, Park and Schwalberg Hispanic ethnicity was one of the strongest variables associated with quitting status, but their study compared quitters with those who continued to smoke at pre-pregnancy rates and did not compare quitters with reduced smokers. Perhaps a larger number of participants in this study, including those who did not try to quit, might have produced similar findings.

Surprisingly, more quitters (49%) reported being single compared to reduced smokers (34%) (marginally significant, p=0.056). One explanation may be the younger age of quitters. However, when participants who were married and living with the baby’s father were combined as one category, more quitters cohabitated when compared with reduced smokers (p=0.056) which had borderline significance. Educational levels for both groups were similar, with completion of the 12th grade being the median. This is
contrary to other studies that identify education as a predictor variable of smoking status in pregnancy, but again other studies did not compare quitters with reduced smokers but rather quitters to those who did not change their smoking habits.10,37

Pregnancy factors which reflect findings from previous studies include: a greater number of reduced smokers lived with a smoker (72.1%, quitters: 57.6%), smoked more cigarettes (11-20) per day in pre-pregnancy (48.8%, versus 15.2%) and were less likely to breastfeed (48.8%, versus 69.7%).2,10,12,19,38,39 Both groups tended to smoke their first cigarette within 30 minutes to an hour of waking in the morning (70.7% versus 66.1%), which does not support the notion that quitters were less addicted to smoking than reduced smokers.1,10 One explanation may be that quitters are in a stage of suspended behavior and in reality they perceive themselves as smokers rather than nonsmokers and will resume smoking once pregnancy is over. When discovering the state of pregnancy, individuals in both groups changed their smoking behavior early in the pregnancy, with more quitters stopping at <2 weeks (28.8%) or 1-2 months (40.9%) of being pregnant compared to reduced smokers who were more likely to change their smoking habits at 1-2 months (41.9%) or 3-4 months (37.2%) into their pregnancy, (p=<0.001). The differences in timing smoking behavior change during pregnancy might be due to the fact that reduced smokers were more pessimistic about being able to quit, especially if they attempted to quit previously. Failed attempts to quit according to attribution theory can decrease one’s self-esteem and increase anxiety, thereby creating future failures to quit smoking.

The reason most frequently offered by respondents for changing their smoking status was the knowledge of the harmful effects that cigarettes have on the unborn fetus.
In spite of that knowledge, it wasn’t a potent enough motivator to encourage the reduced smokers to quit entirely. Perhaps the desire to continue smoking is likely due to a physical and psychological dependence. Further evidence lends support to this notion.

Reduced smokers smoked more cigarettes per day (11-20 cigarettes per day) than quitters (1-5 cigarettes per day) prior to pregnancy which implies nicotine addition, however, the latency to the first cigarette of the day were similar for both groups (30 minutes to 1 hour after awakening in the morning). While both groups had short latency periods to the first cigarette smoked in the day, quitters smoked fewer cigarettes per day which implies less of an addiction to nicotine since a sustained nicotine level require individuals to smoke many cigarettes throughout the day.

A comparison of CPCN scores (ASQ), planned feeding method and reason for changing smoking behaviors revealed quitters that planned to breastfeed were more optimistic (has lower CPCN scores) than reduced smokers (p=0.014). However, there were no associations between groups for the variables: reason for smoking behavior change and CPCN scores (p=0.397). Perhaps optimistic quitters, having experienced successful smoking cessation were more confident they would be successful at breastfeeding. However, attributional styles did not appear to influence behavior change (smoking cessation) even if there was an awareness of smoking’s harmful affects. The data analysis from the loglinear model revealed significantly more quitters who planned to breastfeed where also concerned about the effects of smoking on the unborn infant as compared to reduced smokers who also planned to breastfeed. It is interesting to note from this analysis that reduced smokers who also planned to breastfeed were less likely to state harmful effects of smoking on the unborn infant as the reason for their smoking
behavior change. This finding may indicate that a decreased level of smoking is not harmful to the fetus and therefore reducing smoking will not harm their breast fed infants.

The presence of depression was assessed because of it’s correlation to smoking in the literature. As expected, the majority of individuals were identified as at least minimally depressed (quitters: 59.1%, reduced smokers: 40.9%), with slightly more quitters than reduced smokers suffered from moderate depression, but this finding only reached borderline, significance (quitters: 21.2%, reduced smokers: 18.2%, p=.096). In addition, more reduced smokers reported mild depression (quitters: 13.6%, reduced smokers: 25.0%). This finding does not support previous research showing depressed individuals are more likely to smoke, suggesting further research to correlate depression with smoking during pregnancy is needed.

There are several limitations to this study. The first involves the potential lack of power to detect significant differences. Based on Cohen’s (1988) estimation of a medium effect size ($f=25$), power=80%, and alpha=0.05, for correlational studies, the sample size should have been set at N=177. However, several investigators have consistently found significant correlations in similar populations utilizing a sample size of N=99 indicating that a sample size of 110 participates would be adequate. However, a larger sample size might be a better predictor of optimism versus pessimism among quitters and reduced smokers. Another limitation was the lack of validation of smoking status. Utilizing a self-reporting method to collect data without biochemical confirmation means there is no objective validation of self-reported information provided by the participant. However, several studies have examined the smoking
cessation/relapse phenomenon in child-bearing women using the self-report method without an objective test to determine smoking status.\textsuperscript{7,8} Women report smoking status accurately but may not provide accurate information about the amount they smoke.\textsuperscript{39} In an effort to identify the accuracy in self-reporting of smoking status, Klebanoff et al.\textsuperscript{42} compared infant birth weights with the self-reported data. They concluded that women did in fact report their smoking status accurately.

Another limitation is the design of the study. A cross-sectional study identifies patterns of smoking for the point in time participants are being assessed. It does not identify individuals who adopt fluctuating smoking patterns throughout pregnancy or quitters who relapse. Fluctuating patterns of smoking are described as ranging from smoking cessation-relapse to decrease-increase smoking rates throughout pregnancy. This variable smoking pattern may be related to the understanding that smoking during pregnancy is harmful to the fetus.\textsuperscript{1} It is, therefore, unclear how many pregnant women maintained their reduced smoking status or manifested a quit relapse pattern of smoking throughout pregnancy.\textsuperscript{47}

To broaden our understanding of attributional styles of individuals who quit or reduce their smoking, further research needs to be conducted in this area. The possibility that reduced smokers scored higher for internal-external attributions for negative situations (more pessimistic) than quitters suggests that a difference may exist between the groups; however, a future study examining attributional styles should be conducted with a larger group of participants, including those who don’t quit or reduce smoking. A study designed to examine smoking patterns and attributions at several points throughout pregnancy may identify an association between changing attributions and smoking...
patterns. This may provide greater insight to understanding the fluctuating smoking patterns which might exist among pregnant women who declare themselves as quitter or reduced smokers at the time of their initial prenatal clinic visit.
References


Table 1: Demographic Characteristics: Quitter and Reduced Smokers

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</tr>
<tr>
<td>Asian</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Black</td>
<td>7</td>
<td>15.9</td>
</tr>
<tr>
<td>Hispanic</td>
<td>2</td>
<td>4.5</td>
</tr>
<tr>
<td>White</td>
<td>33</td>
<td>75.0</td>
</tr>
<tr>
<td>Pacific islander</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Native american</td>
<td>1</td>
<td>2.3</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0.0</td>
</tr>
</tbody>
</table>
### Table 1: (Continued) Demographic Characteristics: Quitters and Reduced Smokers

<table>
<thead>
<tr>
<th>Questions</th>
<th>Decreased smoking</th>
<th>Quit smoking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Number of children?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>15</td>
<td>34.1</td>
</tr>
<tr>
<td>1-6</td>
<td>34</td>
<td>65.9</td>
</tr>
<tr>
<td>Were any children born prematurely?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2</td>
<td>4.5</td>
</tr>
<tr>
<td>No</td>
<td>41</td>
<td>93.2</td>
</tr>
<tr>
<td>Number of premature births?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>41</td>
<td>93.2</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>4.5</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Were you smoking during the pregnancies that resulted in premature births?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1</td>
<td>2.3</td>
</tr>
<tr>
<td>No</td>
<td>42</td>
<td>95.5</td>
</tr>
</tbody>
</table>

Note: * significance, p value = <0.05
Table 2: Patterns of Smoking for Quitters and Reduced Smokers

<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
<th>% Quitters</th>
<th>% Reduced smokers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time quit or reduced smoking?</td>
<td>&lt; 2 weeks</td>
<td>28.8</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>1-2 months</td>
<td>40.9</td>
<td>41.9</td>
</tr>
<tr>
<td></td>
<td>3-4 months</td>
<td>10.6</td>
<td>37.2</td>
</tr>
<tr>
<td></td>
<td>5-6 months</td>
<td>7.6</td>
<td>11.6</td>
</tr>
<tr>
<td></td>
<td>&gt; 6 months</td>
<td>7.6</td>
<td>7.0</td>
</tr>
<tr>
<td>Why quit or reduced smoking?</td>
<td>Cigarettes can harm unborn child</td>
<td>71.2</td>
<td>62.8</td>
</tr>
<tr>
<td></td>
<td>Health provider to me I should quit</td>
<td>3.0</td>
<td>7.0</td>
</tr>
<tr>
<td></td>
<td>Wanted to quit anyway</td>
<td>18.2</td>
<td>11.6</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>7.6</td>
<td>18.6</td>
</tr>
<tr>
<td>Smoking effects on fetus?</td>
<td>Fetus becomes addicted to nicotine be</td>
<td>30.3</td>
<td>27.9</td>
</tr>
<tr>
<td></td>
<td>No major effect on the fetus</td>
<td>4.5</td>
<td>11.6</td>
</tr>
<tr>
<td></td>
<td>Babies born to smokers are born healthy</td>
<td>3.0</td>
<td>2.3</td>
</tr>
<tr>
<td></td>
<td>Smokers have smaller babies</td>
<td>56.1</td>
<td>65.1</td>
</tr>
<tr>
<td></td>
<td>Smokers have babies with developmental delays</td>
<td>31.8</td>
<td>11.6</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>10.6</td>
<td>2.3</td>
</tr>
<tr>
<td>Live with a smoker?</td>
<td>Yes</td>
<td>57.6</td>
<td>72.1</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>33.3</td>
<td>25.6</td>
</tr>
<tr>
<td>Plan to breastfeed?</td>
<td>Yes</td>
<td>69.7</td>
<td>48.8</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>27.3</td>
<td>46.5</td>
</tr>
<tr>
<td>Prior to pregnancy amount smoked?</td>
<td>1-5</td>
<td>42.4</td>
<td>11.6</td>
</tr>
<tr>
<td></td>
<td>6-10</td>
<td>28.8</td>
<td>16.3</td>
</tr>
<tr>
<td></td>
<td>11-20</td>
<td>15.2</td>
<td>48.8</td>
</tr>
<tr>
<td></td>
<td>21-30</td>
<td>6.1</td>
<td>18.6</td>
</tr>
<tr>
<td></td>
<td>&gt;30</td>
<td>0.0</td>
<td>4.7</td>
</tr>
<tr>
<td>Didn’t smoke daily</td>
<td>&lt;30 minutes</td>
<td>33.3</td>
<td>39.5</td>
</tr>
<tr>
<td>When smoked latency to first cigarette?</td>
<td>1 hour</td>
<td>31.8</td>
<td>27.9</td>
</tr>
<tr>
<td></td>
<td>2-3 hours</td>
<td>19.7</td>
<td>16.3</td>
</tr>
<tr>
<td></td>
<td>&gt;3 hours</td>
<td>13.6</td>
<td>11.6</td>
</tr>
</tbody>
</table>
Table 3: Levels of Depression for Quitters and Reduced Smokers

<table>
<thead>
<tr>
<th>Beck Depression Scale*</th>
<th>Decreased smoking</th>
<th>Quit smoking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Minimal</td>
<td>18</td>
<td>40.9</td>
</tr>
<tr>
<td>Mild</td>
<td>11</td>
<td>25.0</td>
</tr>
<tr>
<td>Moderate</td>
<td>8</td>
<td>18.2</td>
</tr>
<tr>
<td>Severe</td>
<td>6</td>
<td>13.6</td>
</tr>
</tbody>
</table>

Note: * Categories are based on the Beck Depression Scale where minimal depression begins from a score of zero.
Table 4: Locus of Control for Quitters and Reduced Smokers

<table>
<thead>
<tr>
<th>Locus of control</th>
<th>Decreased smoking</th>
<th>Quit smoking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Internal</td>
<td>42</td>
<td>95.5</td>
</tr>
<tr>
<td>External</td>
<td>1</td>
<td>2.3</td>
</tr>
<tr>
<td>True internal</td>
<td>12</td>
<td>27.6</td>
</tr>
<tr>
<td>True bi-locus</td>
<td>8</td>
<td>18.4</td>
</tr>
<tr>
<td>True external</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Mixed internal</td>
<td>21</td>
<td>48.3</td>
</tr>
<tr>
<td>Mixed external</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Undecided</td>
<td>2</td>
<td>4.6</td>
</tr>
</tbody>
</table>

Note: a indicates no individuals fell into the categories

No significant differences between groups. Sample size: N=108, quitters=65, reduced smokers=43
Table 5: Summary Table for Total Composite Scores: Seligman’s Attributional Styles Questionnaire for Reduced Smokers and Quitters

Summary Table for Total Composite Scores: Seligman’s Attributional Styles Questionnaire For Quitters and Reduced Smokers

<table>
<thead>
<tr>
<th></th>
<th>Reduced smokers</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Mean</td>
<td>Std. dev.</td>
</tr>
<tr>
<td>CoPos</td>
<td>41</td>
<td>74.88</td>
<td>10.56</td>
</tr>
<tr>
<td>CoNeg</td>
<td>41</td>
<td>94.54</td>
<td>12.17</td>
</tr>
<tr>
<td>CPCN*</td>
<td>41</td>
<td>-3.40</td>
<td>2.35</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quitters</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CoPos</td>
<td>56</td>
<td>79.57</td>
<td>13.45</td>
</tr>
<tr>
<td>CoNeg</td>
<td>56</td>
<td>89.45</td>
<td>15.16</td>
</tr>
<tr>
<td>CPCN*</td>
<td>56</td>
<td>-1.70</td>
<td>2.15</td>
</tr>
</tbody>
</table>

NOTE: Missing cells were deleted prior to analysis, so n is smaller than the actual number of samples.

*Quitters were more optimistic compared to reduced smokers (scores ranged from -18 to +18 with negative scores being more pessimistic, zero being neutral and positive scores being more optimistic)
Table 6: Seligman’s Attributional Styles Questionnaire With Bi-Locas Scores for Each Category: Quitters and Reduced Smokers

<table>
<thead>
<tr>
<th>Seligman’s Attributional Styles Questionnaire with Bi-Local Scores for Each Category: Quitters and Reduced Smokers</th>
<th>Decrease smokers</th>
<th>Quit smoking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Internal/external (positive situation)</td>
<td>Internal</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>Bi-locus</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>External</td>
<td>1</td>
</tr>
<tr>
<td>Internal/external (negative situation)</td>
<td>Internal</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Bi-locus</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>External</td>
<td>8</td>
</tr>
<tr>
<td>Internal/external (overall mean)</td>
<td>Internal</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Bi-locus</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>External</td>
<td>1</td>
</tr>
<tr>
<td>Unstable/stable (positive situation)</td>
<td>Unstable</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Bi-locus</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Stable</td>
<td>37</td>
</tr>
<tr>
<td>Unstable/stable (negative situation)</td>
<td>Unstable</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Bi-locus</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Stable</td>
<td>12</td>
</tr>
<tr>
<td>Unstable/stable (overall mean)</td>
<td>Unstable</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Bi-locus</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Stable</td>
<td>24</td>
</tr>
<tr>
<td>Specific/global (positive situation)</td>
<td>Specific</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Bi-locus</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Global</td>
<td>30</td>
</tr>
<tr>
<td>Specific/global (negative situation)</td>
<td>Specific</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>Bi-locus</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Global</td>
<td>10</td>
</tr>
<tr>
<td>Specific/global (overall mean)</td>
<td>Specific</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Bi-locus</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Global</td>
<td>19</td>
</tr>
</tbody>
</table>

Note: * Significant difference between groups with reduced smokers scoring higher (e.g., more pessimistic), p value = 0.049
Figure 1—ASQ Composite Scores for Reduced Smokers

Note: When in a positive situation reduced smokers tended to be more internal, stable, and global then when in negative situations.

Key: I/E= Internal-External
U/S= Unstable-Stable
S/G= Specific-Global
Figure 2—ASQ Composite Scores For Quitters

Note: When in a positive situation quitters tended to be more internal, stable and global then when in negative situations.

Key:  I/E= Internal-External

U/S= Unstable-Stable

S/G= Specific-Global
CHAPTER 5
OTHER FINDINGS

A. Introduction

Data was gathered and analyzed to identify several other factors not discussed in chapter 4. In this chapter analysis and discussion includes the following: method of smoking cessation for quitters, reasons reduced smokers gave for continuing to smoking, knowledge about infant exposure to environmental smoke, and perceived self-efficacy to maintain current smoking status for both quitters and reduced smokers. In addition, postpartum data regarding several key issues will also be presented here, including depression rates for prenatal and postpartum respondents, birth weight, regression back to prepregnancy smoking rates and self-efficacy of postpartum respondents.

B. Additional Prenatal Findings for Both Quitters and Reduced Smokers

Quitters were asked what method of smoking cessation they used to quit. The majority responded that they quit “cold turkey” (78.8%). The remaining number of quitters used other nonpharmacological methods. Only one individual resorted to hypnosis to help her quit smoking and no one used nicotine substitutes (patches or gum). Reduced smokers were asked to provide a reason why they continued smoking during this pregnancy. Two equally predominant themes were evident: one being that they were able to reach for a cigarette during times of stress (34.9%) and the other prevailing theme was the perception of being addicted to cigarettes (34.9%). The majority of participants from both groups understood the implications of smoking during pregnancy. When asked what effect secondhand smoke had on their infants, the majority of quitters and reduced smokers responded that smoking is harmful (quitters: 71.2%; reduced smokers: 80.4%)
and infant exposure leads to more ear and respiratory infections (quitters: 93.9%; and reduced smokers: 86.0%).

The majority of quitters (59.1%) and reduced smokers (72.1%) reported receiving a smoking cessation recommendation from their health care provider at the time of pregnancy confirmation, with slightly more reduced smokers (72.1%) reporting they received this recommendation, however the difference between groups was not statistically significant (p=0.234). When asked if they received written information about smoking cessation only 27 quitters (40.9%) and 19 reduced smokers (44.2%) stated they did (p=0.706). An even more striking and somewhat disturbing statistic is the lack of smoking cessation information provided by instructors of child birthing classes. Only nine quitters (13.6%) and 11 reduced smokers (25.6%) stated they received smoking information in their birthing classes. This finding showed borderline significance (p=0.058).

C. Self-Efficacy and Smoking Behavior

Both quitters and reduced smokers were asked if they saw themselves as non-smokers or smokers. Eighty-three percent of quitters reported that they saw themselves as nonsmokers while 13.6% stated they identified with being smokers. As expected, the opposite was true for the reduced smokers. Most (86%) of the reduced smokers saw themselves as smokers; however, a small percentage of reduced smokers (11.6%) saw themselves as nonsmokers (p<0.001). A comparison positive, composite negative score (CPCN) derived from the Attributional Style Questionnaire (ASQ) and self-efficacy to analyze between group differences was performed via a two-way ANOVA. CPCN means for the five confidence levels (very confident, somewhat confident, not sure, not very
confident, not confident at all) showed statistical differences for quitters versus reduced smokers (F=3.61, p=0.0089). Using Tukey’s HSD multiple comparison procedure significant differences were found between “somewhat confident” and “not confident at all” and between “not sure” and “not confident at all.” This suggests that those in the middle categories are in danger of returning to smoking. There were no significance found within groups for both quitters and reduced smokers between confidence and relapse back to pre-pregnancy smoking rates (quitters: F=1.55, p=0.208, reduced smokers: F=1.82, p=0.139).

Reduced smokers in the postpartum period were asked to provide a percentage from 0 to 100, (where zero represented no confidence at all), signifying their confidence level for quitting smoking in the future. Twenty percent responded that they were very confident they would quit smoking in the future, while another 20% stated they were only somewhat confident of quitting. Approximately 35% were not sure if they would quit. When postpartum sustained quitters were asked to provide a percentage from 0 to 100 reflecting their confidence for staying quit, only 33.3% stated that they were very confident that they would not return to smoking. A larger percentage of postpartum quitters (40.9%) stated they were somewhat confident of remaining abstinent. Thirteen percent stated they were unsure if they would relapse back to smoking, while another 7.6% were not very confident at all. The postpartum self-efficacy data was compared to CPCN scores for both quitters and reduced smokers. Since there were fewer postpartum self-efficacy results (quitters: n=24, reduced smokers: n=16), the self-efficacy data were collapsed to form the following categories: (1) 0-50% and (2) >50% for comparison with CPCN results for both quitters and reduced smokers. For those that reduced smoking, no
differences were observed in CPCN scores between confidence categories (t=-0.21, d.f.=12, p=0.839). However, for the quitters, the majority were significantly optimistic that they would not return to smoking (t=-2.57, d.f.=16, p=0.020). Owing to the small number of individuals in this analysis, caution should be used when interpreting this data.

D. Depression and Smoking: A Prenatal-Postnatal Comparison

Of the 53 postpartum participants (quitters: n=34 and n=19 reduced smokers) who completed the Beck Depression Scale, 42.4% quitters and 27.3% reduced smokers were minimally depressed. Two individuals from both groups (quitters: 30% and reduced smokers: 4.5%) were mildly depressed and only four quitters (6.1%) and three reduced smokers (6.8%) suffered from moderate depression. Interestingly, no quitters reported being severely depressed and only two reduced smokers (4.5%) claimed severe depression. Both pre and postnatal depression scores were compared to identify changes in depression status between the prenatal and postpartum period. Data analysis compared the postpartum respondents pre- and postnatal depression scores to detect: “no change between pre- and postnatal depression”, “negative change meaning postpartum depression worsened compared to prenatal depressive state”, and “positive change meaning postpartum depression improved”. The relative frequencies for “change” variables were calculated as a percentage of the total number of postpartum responses. The analysis revealed very little fluctuation in depressive states between the pre- and postnatal periods. There were no changes in depressive status for 23 quitters and nine reduced smokers. In other words, 63% of quitters and 37.1% of reduced smokers retained the classification of minimally depressed, another 6% of quitters and 5.3% of reduced smokers remained moderately depressed, while only one reduced smoker (5.3%) was still
severely depressed. Only three quitters and three reduced smokers were identified as being more depressed in the postpartum period. One quitter (3%) went from being minimally depressed to mildly depressed, the second quitter moved from minimal to moderate depression, and the third quitter went from mild to moderate depression. The breakdown for reduced smokers was slightly different when compared to the quitters. Two reduced smokers (10.6%) moved from minimal to moderate depression while the third (5.3%) went from mild to severe depression. Analysis of the individuals making positive changes in depression status revealed seven individuals from each group reported decreased levels of depression. One quitter (3%) went from mild to minimal depression. An additional five quitters (15%) moved from moderate to minimal depression and one quitter (3%) went from severe to minimal depression. The reduced smokers had a slightly different profile. Three reduced smokers (15.9%) went from mild to minimal depression and another (5.3%) moved from moderate to mild depression. Two reduced smokers (10.6%) went from moderate to minimal depression and 1 (5.3%) from severe to mild depression (see Table 5.1) (Figures 5.1 & 5.2).

E. Postpartum Questionnaire Summary

1. Infant Health Data

Data collected from the postpartum participants were analyzed as a single group rather than by the quitter or reduced smoker categories. Information on infant birth weight was obtained as an indirect measure of maternal prenatal smoking status since objective measures such as cotinine or carbon monoxide levels were not obtained. Interestingly, 48 or 88.9% of postpartum women reported having a full-term infant with birth weights ranging from 5.5 to greater than 8.9 pounds. The majority of full-term
babies weighed between 7.0 to 8.9 pounds (7.0-7.4 lbs=19%, 7.5-7.9 lbs=13.3%, 8.0-8.4 lbs=19%, and 8.5-8.9 lbs=13.3%). Six respondents (11.1%) reported having a pre-term infant with infant weights ranging from less than 4 pounds to 4.9 pounds. To gain a sense of the health status of the infants at birth and shortly thereafter, the postpartum participants were asked if their babies were discharged from the hospital at the same time they were released. Forty-seven (87%) mothers reported that their babies were discharged from the hospital with them, while 13% of respondents stated their babies remained in the hospital for a longer period of time. When asked if the respondents were currently breast or bottle feeding, only 14 respondents (25.9%) reported that they were breastfeeding. The majority of respondents (66.7%) reported bottle feeding. The prenatal data of intentions to breast or bottle feed were dissimilar to the actual feeding method implemented by the postpartum respondents.

2. Postpartum Smoking Status

Inquiring about current smoking status identified 63% respondents who maintained abstinence at the time of the postpartum contact which was between six weeks to three months postpartum. Twenty respondents (37%) reported that they were smoking in the postpartum period. When asked about the number of cigarettes respondents were currently smoking the majority (51.9%) stated they smoked 1–5 cigarettes per day. Another 18.5% reported that they were smoking between six and 10 cigarettes per day. Only seven participants (13%) reported smoking 1 to 1 ½ packs of cigarettes per day and two individuals (3.7%) stated they were smoking 2 packs per day. Respondents were asked if their postpartum smoking rates remained similar to when they were pregnancy, the same as prior to becoming pregnant or more than their
prepregnancy rate. Since 25 individuals responded to this question and only 19 identified themselves as reduced smokers it can only be surmised that six individuals who initially reported themselves as quitters relapsed during the postpartum period. Eight of these individuals (14.8%) stated that they were smoking less than their prepregnancy rate, 20.4% said they were smoking the same amount as prior to their last pregnancy while six respondents (11.1%) reported smoking more than prior to the current pregnancy. Asking the respondents to provide a number from 0-100 to reflect how confident they were that they would maintain abstinence or quit smoking in the future, only 10 (19%) reported that they were a 100% confident they would stay quit or quit in the future. A larger number (32.3%) stated that they were between 80-90% confident, while 17.1% stated that they were only 40-59% confident. Approximately 13% reported that they were less than 20% confident that they would maintain abstinence or quit smoking in the future (See Table 5.2).

F. Discussion

The majority of pregnant women who quit smoking in the prenatal period did so “cold turkey”. This is in keeping with the current literature which sites approximately 85% to 95% of women smokers stop on their own (USDHHS, 2001). The reasons given by the reduced smokers for continuing to smoke during pregnancy is also supported in the literature (Hung & Chung, 2001; Benowitz, 1996; Pomerleau & Pomerleau, 1992). The perception of nicotine reducing stress is perhaps initiated through the relaxation of muscles by stimulating the Renshaw cells and/or the pulmonary afferent nerves while simultaneously blocking activation of the motor neurons (Benowitz, 1992). The addiction to nicotine perceived by the reduced smokers is rooted in both a physical and
psychological processes. Nicotine, a tertiary amine at normal physiologic pH easily crosses the cell membrane of lung alveoli and circulates to the brain via the vascular system. This process is estimated to occur within 19 seconds from the point of inhalation. The rapid response time for nicotine to get from the lung into the brain is a strong reinforcement to continue the behavior. Cigarette smoking also has a subtle psychoactive effect which comes from the repetitive behavior of puffing on cigarettes hundreds of time per day (O’Loughlin, Kishchuk, DiFranza, Tremblay, & Paradis, 2002). If an individual derives 10 puffs per cigarette and smokes one pack of cigarettes (20 cigarettes per pack) per day, this is equivalent to 73,000 puffs per year. The act of puffing on cigarettes this many times per year is surely expected to exert a strong preference for sustained smoking behavior over time (Benowitz, 1992).

As exemplified by the findings of this study, most pregnant women understand the harmful effects of environmental tobacco smoke (ETS) to their infants. Passive smoke as environmental tobacco smoke is a predictor of increased morbidity for children (Gaffney, 2001). The risk of adverse health effects to children increases even more if two parents in the household smoke near or around the children. Annually, 300,000 children develop lower respiratory infections attributed to second-hand smoke (USDHHS, 2001). ETS increases the risk for new cases of asthma in children who have no previous symptoms of asthma. It also increases the number of exacerbations of severe asthma attacks. The estimated health care cost to treat children’s respiratory conditions due to ETS for those under six years of age is estimated at $661 million (Stoddard & Gray, 1997). Additionally, children who live among smokers also have more annual days of restricted activity, absences from school and bed confinement.
In spite of this knowledge of the harmful effects of ETS some of the women in this study did return to smoking between three weeks and three months of their infant being born. Behavior such as this reflects a parent’s feeling that she can control exposure of smoke to the infant in ways that were not possible when pregnant (Curry, McBride, Grothaus, Lando, & Pirie, 2001). This behavior pattern may illustrate maternal awareness of the harmful effects of cigarettes to be somewhat naive, or maybe the way mothers justify their return to smoking.

Cessation of smoking was discussed by health care providers but less than one-half of the reduced smokers and quitters received written literature on this topic. Interestingly, slightly more reduced smokers received written materials when compared to the quitters. Since there is always a possibility that quitters can relapse back to smoking during the course of pregnancy health care providers should maintain virulence for this occurrence by continuing to ask about maintained abstinence with each prenatal visit. Approximately 12%-15% of women relapse back to smoking during the prenatal period (Peterson, Handel, Kotch, Podedworney, & Rosen, 1992). According to Connor and McIntyre (1999) women who relapse back to smoking during the prenatal period had no prior children. They attribute smoking relapse in first time mothers to the stressors associated with this experience.

Fewer respondents received smoking information in prenatal classes. This data should be interpreted cautiously as respondents may have answered this question in the affirmative but did not attend prenatal classes.

The measurement of self-efficacy to maintain pregnancy smoking status for both groups reflected that quitters were more likely to see themselves as successful quitters
and reduced smokers saw themselves as smokers. In other words, quitters were more confident that they would maintain abstinence while reduced smokers had a lower self-efficacy score to quit in the future. According to McBride and Pirie (1990), only 12% of relapsers intend to return to smoking after delivery, indicating that the majority of quitters intent to stay quit and women who plan to resume smoking do so because they never really planned on quitting completely, they just wanted or needed to stop temporarily (Bottorff, Johnson, Irwin, & Ratner, 2000; Stotts, DiClemente, Carbonari, & Mullen, 2000). Reduced smokers decreased self-efficacy to quit smoking in the future is correlated to the reasons they gave for not being able to quit in the first place.

The postpartum self-efficacy measurements reflected a smaller number of participants who were still a 100% confident that they would maintain their pregnancy smoking status. The majority of participants stated they were 80% confident, the fact that there were more quitters in the postpartum group suggest that confidence levels to maintain abstinence is warning as the postpartum period progresses. This is validated by the data of smoking patterns during the postpartum period. However, the reported smoking levels of participants do not support the findings in the smoking literature for postpartum relapse. According to current research, the rate of relapse during the postpartum period is very similar to the rates of relapse in the general population (Fingerhut, Kleinman, & Kendrick, 1990). About 40% (Carmichael, Ahluwalia, and the PRAMS Working Group, 2000; McBride, Pirie, & Curry, 1992; Mullen, Quinn, & Ershoff, 1990) to 93% (Ershoff, Quinn, & Mullen, 1995; Fingerhut, Kleinman, & Kendrick, 1990; Hutchison, Stevens, and Collins, 1996; Johnson, Ratner, Bottorff, Hall & Dehinten, 2000; USDHHS, 2001) of those who quit during pregnancy relapse during
the postpartum period. The greatest number of women return to smoking by three months (67%) postpartum with a smaller rise in relapse rates by the sixth month (93%) (Ershoff, Quinn, & Mullen, 1995; Fingerhut, Kleinman, & Kendrick, 1990; Mullen, Richardson, Quinn, & Ershoff, 1997; O’Campo, Faden, Brown, & Gielen, 1992; Severson, Andrews, Lichtenstein, Wall, & Akers, 1997). Mullen, Richardson, Quinn, and Ershoff (1997) claim that the average time period between abstinence and relapse is approximately 110.6 days (SD = 6.1), with a median of about 120 days. They claim that during the first six months postpartum, half of those who relapse to smoking will do so by the sixth week. The likelihood of returning to smoking after six months is not as great as during the first six month period. If the participants in this study reflect the same trends found in other studies, it is still too early to predict what percentage of quitters and reduced smokers will resume prepregnancy smoking patterns.

The majority reported returning to prepregnancy smoking rates, however, this finding is not significant since there were only slightly fewer individuals who claimed to be smoking less or more than prior to the last pregnancy. A point of interest in spite of the small number of respondents, is the number of individuals who reported smoking more than their prepregnancy rates. Perhaps these individuals are experiencing greater stress in coping with the demands of motherhood. Women are frequently described as negative affect smokers, meaning they often will smoke in response to uncomfortable emotional situations or to reduce tension (Gilchrist, Schinke, & Nurius, 1989). One explanation for this occurrence is that women are subjected to multiple stressors with compounding effects produced from career demands, and the traditional demands of maintaining a home and raising children (Livson & Letino, 1988). Another explanation offered by
Bottorff, Johnson, Irwin, and Ratner (2000) emphasized the women’s feelings of fatigue, isolation and stress experienced during the postpartum period intensifies over time and smoking helps to alleviate or buffers these feelings.

Nicotine’s antidepressant effect is induced by altering catecholamine release (Churchill, Pariser, Larson, & Silsaver, 1989). This may be especially salient for women who are depressed (Zhu & Valbo, 2002). This was the logic which guided the data collection and analysis of depression for both quitters and reduced smokers. The prenatal depression analysis was discussed in Chapter 4. Interestingly, the comparison of prenatal and postnatal depression reflected very little change in depressive states for quitters and reduced smokers. Additionally, a few postpartum respondents moved in a positive direction meaning they were less depressed after delivery. These findings suggest that smoking patterns during the postpartum period were also independent of depression.

Infant birth weight and health status were obtained to ascertain the presence of unreported smoking relapse (by quitters) or increased smoking rates (by reduced smokers) during pregnancy. The majority of babies born to study participants were full-term infants with weights ranging within the area classified as average weight for gestational age. The majority were also healthy as indicated by the length of hospitalization after birth. This finding suggests that the participants reported pregnancy smoking statuses accurately. Women who stop or smoke fewer cigarettes before the 16th week of gestation have babies 213 grams heavier than women who continue to smoke heavily. Even if smoking cessation or reduction occurs later in gestation (up to the 30th week) there is still the benefit of increased birth weight (MacArthur & Knox, 1988; Abrams & Newman, 1991; Wong & Koren, 2001).
Method of feeding for study participants supports the idea that women who plan to smoke will opt to bottle feed rather than breast feed their infants. According to Amir (2001) and Zimmer (2000), the intention not to breast feed is also predictive for smoking relapse for both black and white females. Breast feeding as a predictor of smoking relapse was also reported by Ratner, Johnson, & Bottorff (1999), in Canada. They found that women who became daily smokers within the six-month postpartum period were 3.6 times more likely (95% CI = 2.1-6.4) to wean their babies from breast feeding when compared to those who did not relapse or who were occasional smokers. Little, Lambert, and Worthington-Roberts (1990) claim that smoking is not the only predictor of breast feeding behaviors. Mothers who did not breast feed and those who weaned their infants within the first postpartum month showed a greater use of both cigarettes and alcohol consumption than those who were still breast feeding at three months postpartum (Edwards, & Sims-Jones, 1998). It seems that women consider breast feeding and smoking potentially harmful to their infants since nicotine can be passed on to the baby through breast milk.
Table 5.1: Pre-Post Pregnancy Depression of Pregnant Quitters and Reduced Smokers

<table>
<thead>
<tr>
<th></th>
<th>Decreased smoking</th>
<th>Quit smoking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>BDI-II PRE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimal</td>
<td>18</td>
<td>40.9</td>
</tr>
<tr>
<td>Mild</td>
<td>11</td>
<td>25.0</td>
</tr>
<tr>
<td>Moderate</td>
<td>8</td>
<td>18.2</td>
</tr>
<tr>
<td>Severe</td>
<td>6</td>
<td>13.6</td>
</tr>
<tr>
<td>Minimal</td>
<td>12</td>
<td>27.3</td>
</tr>
<tr>
<td>BDI-II POST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mild</td>
<td>2</td>
<td>4.5</td>
</tr>
<tr>
<td>Moderate</td>
<td>3</td>
<td>6.8</td>
</tr>
<tr>
<td>Severe</td>
<td>2</td>
<td>4.5</td>
</tr>
<tr>
<td>Minimal to minimal</td>
<td>7</td>
<td>37.1</td>
</tr>
<tr>
<td>No change (pre to post)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mild to mild</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Moderate to moderate</td>
<td>1</td>
<td>5.3</td>
</tr>
<tr>
<td>Severe to severe</td>
<td>1</td>
<td>5.3</td>
</tr>
<tr>
<td>Minimal to mild</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Minimal to moderate</td>
<td>2</td>
<td>10.6</td>
</tr>
<tr>
<td>Negative change (pre to post)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimal to severe</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Mild to moderate</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Mild to severe</td>
<td>1</td>
<td>5.3</td>
</tr>
<tr>
<td>Moderate to severe</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Mild to minimal</td>
<td>3</td>
<td>15.9</td>
</tr>
<tr>
<td>Moderate to mild</td>
<td>1</td>
<td>5.3</td>
</tr>
<tr>
<td>Positive change (pre to post)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate to minimal</td>
<td>2</td>
<td>10.6</td>
</tr>
<tr>
<td>Severe to moderate</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Severe to mild</td>
<td>1</td>
<td>5.3</td>
</tr>
<tr>
<td>Severe to minimal</td>
<td>0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Relative frequencies for “Change” variables were calculated as a percentages of the total number of “post-responses” available (decreasers → n = 19; quitters → n = 33)
### Table 5.2: Pregnancy Outcomes and Postpartum Smoking Behavior

<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your baby was born</td>
<td>Full-term</td>
<td>48</td>
<td>88.9</td>
</tr>
<tr>
<td></td>
<td>Premature</td>
<td>6</td>
<td>11.1</td>
</tr>
<tr>
<td></td>
<td>&lt; 4.00</td>
<td>1</td>
<td>1.9</td>
</tr>
<tr>
<td></td>
<td>4.00-4.4</td>
<td>1</td>
<td>1.9</td>
</tr>
<tr>
<td></td>
<td>4.5-4.9</td>
<td>2</td>
<td>3.8</td>
</tr>
<tr>
<td></td>
<td>5.0-5.4</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>5.5-5.9</td>
<td>5</td>
<td>9.5</td>
</tr>
<tr>
<td>How many pounds did your baby weigh at birth?</td>
<td>6.0-6.4</td>
<td>4</td>
<td>7.6</td>
</tr>
<tr>
<td></td>
<td>6.5-6.9</td>
<td>4</td>
<td>7.6</td>
</tr>
<tr>
<td></td>
<td>7.0-7.4</td>
<td>10</td>
<td>19.0</td>
</tr>
<tr>
<td></td>
<td>7.5-7.9</td>
<td>7</td>
<td>13.3</td>
</tr>
<tr>
<td></td>
<td>8.0-8.4</td>
<td>10</td>
<td>19.0</td>
</tr>
<tr>
<td></td>
<td>8.5-8.9</td>
<td>7</td>
<td>13.3</td>
</tr>
<tr>
<td></td>
<td>&gt; 8.9</td>
<td>2</td>
<td>3.8</td>
</tr>
<tr>
<td>Was the baby discharged from the hospital?</td>
<td>Yes</td>
<td>47</td>
<td>87.0</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>7</td>
<td>13.0</td>
</tr>
<tr>
<td>Have you returned to smoking?</td>
<td>Yes</td>
<td>20</td>
<td>37.0</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>34</td>
<td>63.0</td>
</tr>
<tr>
<td>You are</td>
<td>Breastfeeding</td>
<td>14</td>
<td>25.9</td>
</tr>
<tr>
<td></td>
<td>Bottle feeding</td>
<td>36</td>
<td>66.7</td>
</tr>
<tr>
<td>Your significant other smoker?</td>
<td>Yes</td>
<td>23</td>
<td>42.6</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>29</td>
<td>53.7</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>28</td>
<td>51.9</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>26</td>
<td>48.1</td>
</tr>
<tr>
<td></td>
<td>1-5</td>
<td>28</td>
<td>51.9</td>
</tr>
<tr>
<td>How many cigarettes do you currently smoke?</td>
<td>6-10</td>
<td>10</td>
<td>18.5</td>
</tr>
<tr>
<td>(per day)</td>
<td>11-20</td>
<td>6</td>
<td>11.1</td>
</tr>
<tr>
<td></td>
<td>1-1.5 packs</td>
<td>7</td>
<td>13.0</td>
</tr>
<tr>
<td></td>
<td>2 packs</td>
<td>2</td>
<td>3.7</td>
</tr>
<tr>
<td></td>
<td>&gt; 2 packs</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Less than prior to pregnancy</td>
<td>8</td>
<td>14.8</td>
</tr>
<tr>
<td>I am currently smoking</td>
<td>The same amount as before I became pregnant</td>
<td>11</td>
<td>20.4</td>
</tr>
<tr>
<td></td>
<td>More than before I became Pregnant</td>
<td>6</td>
<td>11.1</td>
</tr>
<tr>
<td></td>
<td>&lt; 20</td>
<td>7</td>
<td>13.3</td>
</tr>
<tr>
<td>Rate yourself on a scale of 0-100 (higher score meaning you will continue to be a nonsmoker)</td>
<td>20-39</td>
<td>3</td>
<td>5.7</td>
</tr>
<tr>
<td></td>
<td>40-59</td>
<td>9</td>
<td>17.1</td>
</tr>
<tr>
<td></td>
<td>60-79</td>
<td>7</td>
<td>13.3</td>
</tr>
<tr>
<td></td>
<td>80-99</td>
<td>17</td>
<td>32.3</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>10</td>
<td>19.0</td>
</tr>
</tbody>
</table>
Figure 5.1: Pre and Post Comparison of Depression for Quitters and Reduced Smokers
CHAPTER 6
DISCUSSION

A. Introduction

To date this researcher is not aware of any study which examined attributions of pregnant women who quit or reduced smoking during the prenatal period. This study has provided additional information, however it is not without some limitations. A discussion of the most important overall findings for this study as well as the strengths and limitations will be presented in this chapter.

B. Discussion of Overall Study Findings

Overall there were no differences in attributional styles and locus of control between pregnant women who quit versus reduce smoking except for internal-external causality for negative situations indicating more pessimism for reduced smokers. The majority of quitters had internal-stable-global attributional styles for positive situations. It was anticipated that quitters would fit the attributional style of an optimist and reduced smokers would have a pessimistic explanatory style. This study, however did not support this idea.

The majority of quitters and reduced smokers also perceived themselves as having mixed internal locus of control, with only a small percentage of individuals in both groups classified as having true bilocus of control. This result does not support the idea that quitters have a more balanced locus of control compared to reduced smokers.

The smoking related data showed the no statistically differences between groups for age, education, ethnicity, marital status, parity and living with a smoker. Quitters were younger than reduced smokers. Clearly intervention programs to maintain sustained
abstinence after delivery should target this group as they are at the beginning of their reproductive lives and the longer they smoke (outside of pregnancy) the more likely they are to be chronic smokers. The variables identified in this study to be significant for quitters versus reduced smokers are in conflict with the current literature. Paterson, Meimanis, and Bain (2003) looked at variables which were predictive of pregnant women who quit versus those who continued to smoke throughout pregnancy. They identified three variables: (1) having another smoker in the home, (2) having other children in the household, and (3) not having post-secondary education, to be predictive of pregnant women who continued to smoke. Other studies have looked at the same variables as in this study and identified the following: age, marital status, parity, education and living with another smoker to be predictive of continued smoking throughout pregnancy (Dodds, 1995; Hajek et al., 2001; Muhajarine, D’Arcy, & Edouard, 1997; Ockene et al., 2002). These inconsistencies suggest further research is needed in this area. Additionally, more research is needed to assess variables predictive of pregnant women who reduce their smoking as this data is non-existent.

There were few differences between quitters and reduced smokers on the following variables: latency to the first cigarette smoked in the morning (p=.888), number of cigarettes smoked per day, length of time from learning of pregnancy and smoking behavior change (p=<0.001), and anticipated method of feeding (p=:032). Quitters were more likely to smoke fewer cigarettes per day prior to pregnancy, have a longer latency to the first cigarette in the morning, quit smoking early in pregnancy with the majority quitting “cold turkey”, and planned to breastfeed after delivery. Reduced smokers were asked to provide a reason for not being able to quit smoking in spite of fact that smoking is harmful to their unborn infant. The two prevailing themes associated with
continued smoking were stress and nicotine addiction. Depression as an underlying cause for continued smoking in pregnancy was not supported in this study. Contrary to data in other studies, more quitters suffered from a greater degree of depression than reduced smokers.

Participants were also asked to provide their perception of themselves as smoker or non-smoker. As expected, more reduced smokers saw themselves as smokers; however, a small group of reduced smokers stated they saw themselves as non-smokers. One explanation is that they were preparing to quit smoking in the near future. These reduced smokers should be targeted for smoking cessation intervention.

Self-efficacy was also measured for both groups. As expected, the quitters were more likely to report a higher degree of confidence for remaining abstinent whereas reduced smokers had a pessimistic attitude about maintaining their reduced level of smoking or eventually quitting smoking. Self-efficacy has frequently been associated with successful cessation of smoking, the self-efficacy findings in this study supports the current literature (Siero, Van Diem, Voorrips, & Willemsen, 2004).

This is the first study which examined attributional styles of low-socioeconomic pregnant women who either quit or reduced their smoking in the antepartum period. The findings from this study suggest that smoking behavior change during pregnancy is a complex phenomenon which involve more than attributional styles alone.

C. Strengths

1. Type of Study

One of the strengths of this study is that data collection commenced shortly after the smoking behavior change was made by each participant. The data collection coincided with the timing of the smoking behavior change or was within a few
weeks after the participants changed their smoking habits. Additionally, the time two data were collected six weeks to three months after delivery. Obtaining the study information, especially the items requiring participant recall, was more likely to be accurate since the timing of the actual events and reporting of them were within close proximity of each other. This reduced the risk of recall error by the participants.

2. Method of Data Collection

Switching to the telephone interview method of data collection helped to minimize incorrect or incomplete data acquisition specifically among this low income population. The Attributional Style Questionnaire were especially challenging for many participants who were asked to complete it while in the medical clinic. Realizing this, telephone interview method of data collection was instituted. Contacting participants also helped to reduce the number of participants lost to follow-up (lost to time two data collection) since relying on contacting them during their 6-week postpartum exam at the clinic frequently conflicted with the researcher’s schedule. Additionally, the women that were approached to take part in the study were more willing to participate when they were told that they would be contacted by telephone because the idea of being able to complete the questionnaire at a time of their choosing seemed more acceptable to them.

3. Standardized Measurement Tools

Utilizing standardized questionnaires with good validity and reliability also strengthened the results obtained. Many studies have been conducted using the Attributional Styles Questionnaire, the Smoke Locus of Control Questionnaire, and the Beck Depression Inventory with many different populations of individuals with good validity and reliability (discussed in chapter 2).
D. Limitations

1. No Objective Measure of Smoking Status

A limitation of the study was the lack of validation of smoking status. Utilizing a self-reporting method to collect data without biochemical confirmation means there is no objective validation of self-reported information provided by the participant. In an effort to identify the accuracy in self-reporting smoking status Klebanoff et al (2001) compared infant birth weights, cotinine levels and maternal self-reported smoking status, they concluded that women did accurately report their smoking status.

2. Study Design

Additionally, a cross-section study design identified patterns of smoking for the point in time participants were assessed. Hence, the traditional view of smoking cessation is frequently viewed as a dichotomy, e.g., the participants are classified as quitters or smokers. However, as research data on smoking behaviors accumulates, the once clear dichotomy is not so obvious since individuals can adopt fluctuating smoking patterns. Fluctuating pattern of smoking is described as ranging from smoking cessation-relapse to decrease-increase smoking rates throughout pregnancy. This variable smoking pattern may be related to the understanding that smoking during pregnancy is harmful to the fetus (USDHHS, 2001). It is, therefore, unclear how many pregnant women maintained their reduced smoking status or even their quitter status throughout pregnancy (Pickett, Wakschlag, Dai, & Leventhal, 2003).

3. Attribution Theory

Utilizing the attribution theory as applied in this study has inherent problems as well. Previous research using this theory has suffered from “fundamental attribution researcher error” (Russell, 1982). In other words, an assumption is made that
the researcher can accurately interpret the meaning of the participant’s responses for each of the categories. Even when the causal attribution is clear, the attributor (participant) may perceive the cause quite differently from the researcher. Precautions were taken to minimize this effect by utilizing the Attributional Style Questionnaire allowed participants to respond in their own words giving major reasons for the cause of the situations presented. Additionally, assessing attributional styles through the rating of hypothetical situations not related to smoking and pregnancy meant that subjects were asked to rate events they did not personally experience. It is therefore, difficult to know whether these ratings reflect how the participants would explain their actual smoking behavior.

4. Generalizability

The sample size of both groups of participants was small therefore, the idea that these are two homogenous groups of individuals cannot be discounted. As such, the study results cannot be generalized to all pregnant women who quit or reduce smoking in the antepartum period.
A. Conclusion

The evidence presented here supports the argument that smoking during pregnancy is a complex phenomenon. Even with the concerted efforts of public and private health agencies devoting their energies to eliminate cigarette use, this problem persists. There is no doubt that this problem is multifactorial in origin, encompassing the realm of a smoker's social (social support), psychological (behavior reinforcement, attitudes and perceptions) and physical (addiction) being. Additionally, the deleterious effects of smoking does not stop with the mother who smokes, instead it is passes on to her offspring which sets the stage for potential multiple generational affects.

While pregnancy is one of those life events that lends itself to motive women to stop or reduce smoking, the number of women who are able to maintain long-term abstinence or reduction is disappointing. The perplexing phenomenon of women's inability to maintain abstinence or reduced smoking rates in the prenatal period has generated much research in this area. Perhaps stopping or reducing smoking during pregnancy is a conscious decision to suspend or minimize a habit and not a change in behavior that is intentional, permanent or made for the woman's personal benefit.

B. Implications of Research for the Field of Preventive Care

It has been sited in the explanatory styles literature that individuals who are optimistic have a much more positive way of thinking about coping with illness or attempting to prevent it (Brennan & Charnetski, 2000; Devincent, Lobel, Meyer, & Kaminer, 2000; Scheier, Carver, & Bridges, 2000). Additionally, those with optimistic
coping styles are better able to deal with stress and depression (Gillham & Seligman, 1999). While this study found that both quitters and reduced smokers were pessimistic and quitters were less pessimistic than reduced smokers, there was also a significant difference in internality/externality between the two groups. This is worth pursuing in future research. If future studies identify pregnant smokers to have a pessimistic explanatory style, smoking cessation interventions could take a more innovative approach to behavior change. Individual and group therapies can focus on helping smokers develop skills necessary to help them change their negative outlook on life to a more positive one. Changing one’s outlook to be more optimistic has been shown to help people deal with the psychological strain such as dealing with stress, display fewer depressive symptoms, and feel physically healthy (Christman, 1990). This type of fine-tuning of intervention programs can be integrated with other intervention techniques such as enhancing self-control to increase successful cessation of smoking during pregnancy.

C. Directions for Future Research

The evidence presented in this study suggests future research should focus on a more comprehensive assessment of major determinants of pregnant smoking and cessation so that appropriate intervention strategies can, in turn, be developed. A prospective study measuring attributions in each of the three trimesters should be conducted to measure changes in attributions over time.

Another area of concern is whether or not smoking cessation or smoking reduction rates throughout pregnancy fluctuate. National data have not tracked smoking by trimesters of pregnancy, precluding the opportunity to observe changes in smoking patterns in each trimester. Tracking smoking patterns and behaviors throughout
pregnancy may identify potential changes of smoking patterns. Additionally, does living with another who smokes influence fluctuating patterns in the pregnant reduced smoker and how does a pregnant smoker who quits or reduces her smoking affect other smokers in the home? This knowledge may help health care providers maintain vigilance and provide timely intervention if or when smoking relapse or increases in smoking rates occur among pregnant women. Additionally, this knowledge can provide timely smoking cessation intervention for other household members who also smoke.

Additionally, based on their representation in the population of pregnant smokers, quitters make up the majority of pregnant smokers. How these women manage to successfully quit during pregnancy is not apparent from the research literature. Nor are the pregnancy-specific physiological and endocrinological changes on smoking behavior well defined. For example, how hormonal changes in pregnancy affect cigarette cravings or withdrawal symptoms needs further study. Some research indicates that nausea or the magnification of “morning sickness” symptoms may lead to smoking cessation for some, however, it isn’t apparent if other states of pregnancy impact cessation or continued smoking (Cnattingius, 2003).

It is not clear whether or not smoking reduces stress. However, high stress situations are frequently sited as the cause for being unable to quit or relapsing (DiClemente & Prochaska, 1982; Hadaway, Beyerstein, & Kimball, 1986; O’Connell & Shiffman, 1988; Revel, Warburton, & Wesnes, 1985). Women are frequently described as negative affect smokers, meaning they often will smoke in response to uncomfortable emotional situations or to reduce tension (Gilchrist, Schinke, & Nurius, 1989; Ikard & Tomkins, 1973). One explanation for this occurrence is that women are subjected to multiple stressors with compounding effects produced from career demands, and the
traditional demands of maintaining a home and raising children (Livson & Letino, 1988). Another explanation offered by Bottorff, Johnson, Irwin, and Ratner (2000) emphasizes women’s feelings of fatigue, isolation and stress in pregnancy and postpartum which intensifies over time and smoking helps to alleviate or buffers these feelings. Measurement of cortisol levels as one objective measure reflecting stress levels could be correlated with responses to stress scales/questionnaires. Since the cortisol level (which are usually higher during pregnancy versus non-pregnancy) is unknown in the pregnancy state, normal cortisol ranges for pregnant women will first need to be established.

Carmichael and Ahluwalia, (2000) found that stressful events in the postpartum period are associated with an increased risk for smoking relapse. They found that if women reported five stressful events they were 1.8 times more likely to relapse relative to women reporting no stressful events. In a qualitative study, Bottorff, Johnson, Irwin, and Ratner (2000) related comments from study participants who described smoking relapse as “calming,” “relaxing,” or “soothing” (p. 132). While it is clear that women associate stress reduction with smoking, the physiology is not clear. Further research of how stress is related to smoking during pregnancy needs to be pursued.

Finally, the major identifying factors for those who quit or continue to smoke during pregnancy have been documented (discussed in chapter 2); however, what is not well defined is prioritizing the range of variables which may be responsible for pregnancy and postpartum smoking behaviors. In spite of the fact that women are aware smoking during pregnancy is harmful, many continue to smoke, and many who quit return to smoking during the postpartum period. A more comprehensive analysis of the identifying factors along with studies prioritizing these factors is much needed. For example, a healthy maternal identity is a necessary occurrence which helps the pregnant
woman transcend into a new role as “mother”. However, this transition is by its very nature an unsettling time because it requires one to reconfigure a well established former role to one that is new and somewhat uncertain. While in this period of flux, new opportunities for growth present themselves, it can also be a time when one experiences much conflict and stress (MacLean, Estable, Sims-Jones, & Edwards, 2002; Mercer, 1986). Little is known about the extent to which the pregnancy experience influences smoking behavior. Until prioritized variables is defined it is doubtful that long-term interventions will be successful for pregnant smokers.
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