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An Integrated Model Predicting Smoking Stage of Change Among a Sample of Government-Insured and Indigent Medical Patients.

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DEDICATION

This is dedicated to my wife and soul-mate, Angela Gossen Boudreaux, without whom I would never have made it through graduate school and probably would have ended up a bum on some street corner, starving, begging for food (or so she tells me). Truly, she deserves an honorary degree in her own right for having to endure the long nights of work with the computer glow in her face and buzz of the monitor in her ear, the tedious text revisions, ceaseless psychobabble, and boring parties filled with obsessed students with one-track minds. My wife is the most wonderful, loving, kind, caring, thoughtful, beautiful, selfless, honest, hard-working, committed, joyful person I know. She remains one of my most profound sources of inspiration.

Secondly, I would like to dedicate this dissertation to my beautiful God-child, Paige Boudreaux. May she always be a light unto the world.
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ABSTRACT

This study found that an integrated model using variables from several psychosocial theories, including the theory of planned behavior, decisional balance theory, and self-efficacy theory, was successful in predicting smoking stage of change. Specifically, ever smokers with higher self-efficacy, higher ratings of the cons of smoking, and lower ratings of the pros were more ready to quit or had already quit. Additionally, those who rated smoking as less tempting and who reported having people in their support system who were supportive of their cessation were in later stages of change.

Theses results point to the importance of assessing cognitions towards smoking and targeting these attitudes and beliefs with appropriate interventions in an effort to move smokers through the stages of readiness to actual cessation.
SMOKING AND HEALTH

"Cigarette smoking is the most important preventable cause of morbidity and premature mortality in the United States . . ." (Center for Disease Control (CDC). 1994a, pg 469).

The above quote summarizes the main reason why research on smoking and smoking cessation remains so important, and it concisely relates the primary impetus behind this project. Smoking significantly increases the risk of developing diseases and disorders of virtually every organ system in the body, including the cardiovascular, pulmonary, genitourinary, and digestive systems (CDC, 1994a). Approximately 390,000 people die each year as a result of cigarette smoking, and it accounts for 21% of all coronary heart disease deaths, 87% of lung cancer deaths, and 30% of all cancer deaths in the United States (USDHHS, 1992).

Furthermore, 20-30% of all babies born with low birth weight can be attributed to the mother’s cigarette smoking during pregnancy, and smoking is responsible for nearly 14% of all preterm deliveries and approximately 10% of all infant deaths (USDHHS, 1989). The dangers of cigarette smoke extend to those who simply share the same air space with a smoker, i.e., second-hand smokers. Diseases such as lung cancer, respiratory difficulties and infections, and middle ear infections are all more common in people who live with a smoker but who themselves do not smoke (USDHHS, 1992).
Smoking Prevalence

In 1993, 25.4% of all Americans smoked regularly (27.0% for men and 24.0% for women) (CDC, 1994b). Smoking was highest among persons 25-44 years old (29.2%) and lowest for those 65 and older (11.8%). In 1992, 24.2% of all Louisiana citizens smoked (Giovino et al., 1994). While lower than the national average, this prevalence rate is 2 percentage points above the national median (22.2%) and places Louisiana in the top 10 states regarding smoking prevalence.

Smoking in Low SES Populations. Smoking is more prevalent among certain racial and ethnic minorities, which, combined with other inherent risk factors already plaguing these populations, places them at dramatically elevated risk for morbidity and premature death (USDHHS, 1989). Specifically, American Indian Males (35.9%), African American males (32.4%), and Hispanic males (28.3) have demonstrated consistently higher rates of smoking when compared to caucasian males (27.0%) (CDC, 1994b). Research also suggests that people in lower paying, blue-collar occupations and those with less education are more likely to smoke than people in white-collar occupations with more education (USDHHS, 1989). People below the poverty level have substantially higher prevalence rates (32.1%) than those above the poverty level (23.8%) (CDC, 1994b). In sum, research has consistently found that people who are low in socio-economic status (SES) are at highest risk for developing the smoking habit. This may
reflect their higher likelihood of being targeted for advertisement and promotional campaigns, as well as cultural trends and factors that have not yet been fully explored (Giovino et al., 1994).

Healthy People 2000 (1992) was written by the Department of Health and Human Services and is the manual summarizing the nation's health promotion and disease prevention objectives for the end of the 20th century. It targets those low in SES as an important subsection of the nation's citizenry that have been understudied and underserved by researchers in the past. Healthy People 2000 (1992) maintains that sound empirical studies conducted on people low in SES may help to clarify which factors place them at greater risk for smoking and may help in efforts to develop more effective intervention programs. In fact, researchers have suggested that group-specific interventions for health education and promotion are more readily accepted and produce better, faster, and more enduring results than nonspecific interventions (Marin et al., 1995). This implies that if an intervention program is to work properly for minorities or undereducated citizens, the program should be based on research done with these very populations and should be tailored to suit their specific needs, abilities, and resources.
SMOKING CESSATION

Evidence suggests that total and per capita cigarette consumption in the United States have steadily declined over the past 25 years (CDC, 1994b). While 42% of adults smoked in 1965, only 29% smoked in 1987 and 25.4% smoked in 1993. The decrease in smoking prevalence has led to substantial savings in terms of human life and health. "Between 1964 and 1985, approximately three-quarters of a million smoking-related deaths were avoided or postponed as a result of decisions to quit smoking or not to start. Each of these avoided or postponed deaths represented an average gain in life expectancy of two decades" (USDHHS, 1989, pg vi.). The decline in smoking can be attributed to numerous factors, including an increased mass media campaign designed to reduce the appeal of smoking, reduce the number of new smokers, and encourage those who smoke to quit; legal restrictions on advertising; advancements in research concerning smoking and smoking cessation; an increase in the inflation-adjusted price of cigarettes; and, an increase in availability and effectiveness of smoking cessation methods and programs, such as nicotine replacement gum and patches (Giovino et al., 1994).

While society has made terrific gains in reducing the rate of smoking, the latest available data indicates that smoking nevertheless remains the single most preventable cause of morbidity and premature mortality in the United States, and over a quarter of all adults in the United States still smoke (CDC,
1994b). Obviously, the programs already in place have not been fully effective, and much remains to be accomplished in reducing the rates of smoking.
PREDICTORS AND DETERMINANTS OF SMOKING AND SMOKING CESSATION

Our knowledge of the reasons why people smoke and why they stop smoking, while certainly greater now than ever, remains incomplete. As mentioned above, this is particularly true for subpopulations such as those low in SES. The following is a brief summary of several well-researched models that have been used to explain and predict a multitude of behaviors, including efforts to quit smoking.

The Transtheoretical Model

The transtheoretical model was based on studies of how people self-change, as well as how people change during therapy, and is composed of two primary components: 1) the stages of change and 2) the processes of change (Prochaska, DiClemente, & Norcross, 1992; Prochaska et al., 1992; Prochaska et al., 1994). The stages of change consist of 5 stages that represent incremental progressions in readiness/intent to modify one's behavior. The processes of change consist of 10 strategies or activities that appear to describe how people change their affect, cognition, and/or behavior and which lead to a progression through the 5 stages of change. This review will focus only on the stages of change since the processes of change do not represent variables of particular interest in this project.

Initial formulations of the stages of change began with studies on smoking cessation then expanded to include a broad range of other behaviors. The stages of change represent a marriage between cognition and behavior,
with the first 2 stages being defined in purely cognitive terms and the last 2 being defined purely in behavioral terms. The middle stage, Preparation, is usually defined in both cognitive and behavioral terms. What follows is a brief summary of the 5 stages.

**Precontemplation.** People in this stage have no intention to change their behavior in the foreseeable future (i.e., within the next 6 months). They may be unaware of their problem or the severity of the consequences of their behavior. Although people in the Precontemplation stage may sometimes have vague "wishes" to change, they have no serious intention. If these people make an attempt to change it is usually because someone else in the environment is aware of the problem and is pushing them to do so (i.e., a judge, spouse, parent).

**Contemplation.** People in this stage demonstrate an awareness of the problem and are seriously thinking about overcoming it, usually within the next 6 months. However, they have not yet made a concerted effort to change.

**Preparation.** This stage describes people who intend to change in the next 30 days and have made some sort of active attempt at change over during the past year. However, these people have not been able to maintain their change and have resumed the maladaptive behavior.

**Action.** People in this stage have successfully modified their behavior, experiences, and/or environment in order to overcome their
problem. It involves overt behavioral changes and requires considerable commitment of time and energy. They must have successfully altered the behavior for a period of greater than 1 day but less than 6 months.

**Maintenance.** People in this stage are working to prevent relapse and consolidate gains. They have maintained behavior change for greater than 6 months.

The stages of change model implies that not everyone intends to change and, of those who do, differences exist in the degree to which they are motivated to change. Recent formulations of the stages of change indicate that progress through the stages may not be linear. Rather, individuals may spiral through the stages (Prochaska, DiClemente, & Norcross, 1992). This implies that people may relapse into earlier stages they have already been through but do not revolve endlessly in circles or regress all the way back to where they began. Instead, each time relapsers recycle through the stages, they potentially learn from their mistakes and can try something different the next time around, thus moving closer to lasting behavior change.

The stages of change model implies that different intervention strategies should be implemented depending a person's readiness if maximum success is to be achieved (Prochaska, DiClemente, & Norcross, 1992). In particular, people who begin a behavior change program in the Contemplation and Preparation stages are much more likely to successfully
maintain the behavior than those in the Precontemplation stage. Research suggests that more cognitive oriented approaches should be attempted with people in the Precontemplation and Contemplation stages to move them to the action oriented stages (Prochaska, DiClemente, & Norcross, 1992). Active, behavioral treatment is far less effective with people in the first two stages since they do not have a strong enough intention to change. Research indicates that programs designed to move people only one stage in the early stages (i.e., from Precontemplation to Contemplation) can double the chances that they will take action on their own in the near future (Prochaska & DiClemente, 1992). More active, behaviorally oriented approaches should be taken with those in the Preparation and Action stages as they have proven they have high intentions to change and have already made or are making behavioral attempts.

Researchers have found that a person's stage is a powerful predictor of the likelihood that they will benefit from a treatment program, especially if it is action-oriented and is not tailored to the person's personal readiness to change. One study (Ockene, Ockene, & Kristellar, 1988; cited in Prochaska, DiClemente, & Norcross, 1992) compared a regular-care, outpatient smoking cessation program with an intensive, special-care program. The special-care program resulted in 94% cessation rate for subjects who began the program in the Preparation and Action stages, compared to a significantly lower 66% for subjects in the same stages of change receiving the regular-care program.
However, for subjects in the Precontemplation and Contemplation stages, the special-care and regular-care programs resulted in the same cessation rates. These results imply that the intensity of the cessation program does not make a difference if people are not committed to stop smoking. Furthermore, regardless of treatment type, initial stage of change predicted cessation rate (22% of those in Precontemplation, 43% of those in Contemplation, 76% of those in Preparation and Action). Other research corroborates this study (e.g., Prochaska, Norcross, Fowler, Follick, & Abrams, 1992), finding initial stage of change to be a powerful predictor of both initial and follow-up treatment success and that treatment can "propel" people through the stages. Finally, preliminary results indicate that tailoring treatment approaches to a person's stage of change may result in more efficient treatment implementation and improved treatment outcome.

Two mismatches between stage and treatment are prevalent (Prochaska, DiClemente, & Norcross, 1992). The first is relying primarily on cognitive processes (such as consciousness raising, self-reevaluation) while moving into the Action stage. Such attempts to change behaviors simply by increasing awareness is a common criticism of classical psychoanalysis. Insight alone is not sufficient for behavior change. The second mismatch is relying primarily on behavioral processes (such as reinforcement management, stimulus control, counterconditioning) without the necessary awareness and readiness provided in the Contemplation and Preparation
stages. These people try to change their behavior without insight, a common criticism of radical behaviorism. Overt action without awareness may lead to transient change. According to the transtheoretical model, these mismatches should be avoided or risk relapse and engendering a sense of failure in the person.

While the stages of change model possesses substantial empirical support and is intuitively satisfying, in and of itself it does not answer several important questions. What differences are there between a person in the Precontemplation stage and a person in the Action stage besides the presence or absence of the behavior? Are there cognitive differences? What cognitive and behavioral changes take place in a person to prepare him/her for taking action and maintaining the change? What "moves" a person through the stages? Several other theories have been used to help explore the answers to these questions, both as they relate to stage of change and as independent models of smoking and smoking cessation. Three of the most important and widely studied are decisional balance theory, self-efficacy theory, and the theory of planned behavior.

Decisional Balance Theory

The decisional balance theory was developed by Janis and Mann (1968, 1977). The most basic and widely used form of this theory posits that people engage in a behavior based on the pros and cons associated with the behavior. If the pros are high and the cons are low, they are more likely to
perform the behavior. In other words, if a person perceives many advantages and few disadvantages associated with performing a behavior, he/she is more likely to perform the behavior. This theory has been used to help explain the cognitive processes involved in moving from one stage of change to another (Marcus & Owen, 1992; Prochaska et al., 1994).

Researchers have found that, for people in the Precontemplation stage, the pros of the behavior outweigh the cons. This pattern begins to change as people move through the Contemplation and Preparation stages, and, by the time they reach the Action stage, the opposite pattern is observed — namely, the cons of the behavior outweigh the pros. The available evidence consistently indicates that the pros and cons "cross over" before people actually take action (see Prochaska et al., 1994). In fact, evidence (e.g., Prochaska et al., 1994; Velicer, DiClemente, Prochaska, & Brandenburg, 1985) suggests that people first begin to increase their evaluation of the cons of the behavior, then decrease their evaluation of the pros. An increase in cons corresponds to movement from Precontemplation to Contemplation, while a decrease in pros corresponds to movement from Contemplation to Action.

**Self-Efficacy Theory**

Self-efficacy theory states that people's beliefs concerning their capability of performing a specific behavior is very important in determining whether they actually engage in the behavior (Bandura, 1977). Proponents of
this theory view self-efficacy as an important link between knowledge and action. People who know how to perform a behavior do not always do so. First, they must believe they have the ability to perform a behavior before they actually act. People who are high in self-efficacy regarding a particular behavior, then, are more likely to engage in the behavior. The evidence indicates that self-efficacy can predict smoking abstinence and relapse very well, and it is a better predictor of cessation than physiological dependence, coping style, motivation, confidence in treatment, and expectancies regarding the rewards of smoking (Lawrance & McLeroy, 1986).

Some research suggests self-efficacy for smoking cessation may be related to how tempting certain situations are for a smoker (DiClemente, 1986; Prochaska, Velicer, Guadagnoli, Rossi, & DiClemente, 1991; Velicer et al, 1990). People who have a strong urge to smoke in certain situations typically feel like they have less control over resisting smoking in those situations. Hence, the more tempted a person is to smoke, and the more situations this temptation arises in, the less likely he/she is to initiate smoking cessation or to maintain abstinence. Temptation and self-efficacy appear to be closely linked.

Researchers have incorporated the theory of self-efficacy into the stages of change model. Marcus and Owen (1992) found that self-efficacy regarding exercise reliably predicted stage; Precontemplators and Contemplators had the lowest scores and those in the Maintenance stage had
the highest scores. DiClemente, Prochaska, & Gibertini (1985) found the same pattern in smokers and former smokers. The greater a person’s belief that he can successfully quit smoking, the greater the likelihood that he will try and succeed at cessation.

The Theory of Planned Behavior (Figure 1)

The theory of planned behavior (TOPB) was initially formulated by Ajzen (1985; 1991) and was designed in response to the inability of other theories of behavior change that relied solely on 'attitudinal', 'trait', or 'personality' approaches to predict specific human behavior (Ajzen, 1991). The ultimate goal of the TOPB, then, is to be able to predict specific human behavior using constructs that are not 'trait' biased.

A central construct of the TOPB is labelled intention. Intention refers to the degree to which a person is committed to performing the behavior. Consistent with reason, as the strength of a person's intention to perform a behavior increases, the more likely he/she is to perform the behavior. The smaller the time lapse between measurement of the intention and the performance of the behavior, the stronger the association. In other words, the association between a person's intention to exercise will be a better predictor of exercising behavior tonight than it will be of next month at the same time. According to Ajzen, though other factors sometimes have direct effects on behavior outside of their influence on intention, intention is generally the final common denominator predicting actual behavior.
Several important factors influence whether a person intends to perform a behavior. A variable of considerable interest in predicting intention is attitude toward the behavior. Basically, a person’s attitude toward a behavior is measured by the degree to which he/she has a favorable or unfavorable evaluation of the behavior. If a person views a behavior as good, rewarding, pleasant, etc., he/she is more likely to perform the behavior, and vice versa. Furthermore, attitude is presumed to be a function of a person’s behavioral beliefs, which are perceptions of the advantages and disadvantages of engaging in the behavior. If a person believes the advantages to be great and the disadvantages to be small, he will have a more favorable attitude toward the behavior and will, therefore, be more likely to engage in the behavior. (This is represented by the upper "arm" of the model in Figure 1).

Behavioral Beliefs  Attitude Toward the Behavior

Subjective Norm  Intention  Behavior

Control Beliefs  Perceived Behavioral Control

Figure 1: The Theory of Planned Behavior

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If the behavior is totally under volitional control (i.e., voting for a presidential candidate), intention is a very good predictor of behavior. However, most behaviors do not fit this definition. Not only do people vary in their degree of actual behavioral control (e.g., time, money, skill, knowledge, and support from others), but they also vary in their perceived behavioral control (Ajzen, 1991), or the degree to which they believe they can control a behavior. The degree to which a person believes he can control his/her behavior can directly influence his intention to perform the behavior. Those people with higher confidence generally will have a more intense commitment to perform the behavior. According to the theory of planned behavior, it is also entirely possible that perceived behavioral control exerts a direct affect on whether a person actually performs the behavior over and above its influence on intention. For example, two people may have equally high intentions to exercise, but only the one who also has high confidence that he can actually achieve the goal will actually succeed (Ajzen, 1991). While it is generally the case that those high in perceived behavioral control will also possess high intention to perform the behavior, this is not always the case since intention is affected by several other variables (e.g., attitudes, subjective norm). Therefore, perceived behavioral control can influence behavior both directly and indirectly.

Proponents of the TOPB note that perceived behavioral control is influenced largely by a person's control beliefs, which are the beliefs he
possesses regarding the available opportunities and resources at his disposal. The greater a person’s belief that he has the opportunity and resources to accomplish a behavior, and the fewer barriers he anticipates, the more likely he is to believe he can control the behavior. This leads to a greater likelihood that he will actually perform the behavior. (This is represented by the lower "arm" of the model in Figure 1).

The final predictor of intention subsumed under the TOPB is subjective norm, which refers to a person’s perceived social pressure to perform the behavior. If a person believes the important people in his/her life (i.e., doctor, spouse, family) are supportive of the behavior, they are more likely to engage in the behavior. (This is represented by the middle "arm" of the model in Figure 1).

The TOPB (or parts of it) has been used to successfully predict a variety of behaviors, including regular physical activity, simple strategy choices in laboratory games, abortions, smoking marijuana, and choosing a candidate in an election (Ajzen, 1991). Only one published study has used it to predict smoking behavior. Godin, Valois, LePage, and Desharnais (1992) found that perceived behavioral control, attitudes, and subjective norm helped explain intention to quit and whether subjects actually tried to quit smoking. Perceived behavioral control accounted for the largest portion of the variance in smoking cessation, suggesting that while other variables can be important, confidence in one’s ability to quit smoking is of utmost importance to
successful abstinence. This study supported the validity of the TOPB in predicting smoking cessation, especially regarding the effects of perceived behavioral control.

The TOPB has only been integrated with the stages of change model in one published study. Courneya (1995) used the TOPB to predict readiness for and/or participation in regular exercise. Correlations, ANOVAs, and path analyses converged upon the conclusion that the most important variables in discriminating among stage of change were intention, attitudes, and perceived behavioral control. People among each stage differed from people in all the other stages across one or more of these variables. The only exception to this rule applied to the Action and Maintenance stages. The path analysis generally supported the model's structure as presented in Figure 1, though several variables had direct effects on other variables in an unexpected manner. For instance, behavioral beliefs and control beliefs had weak but statistically significant effects on subjective norm, which was not anticipated based on the TOPB, and attitude had a direct effect on stage of readiness, which was not hypothesized by the author of the study. Nonetheless, the relations were strongest along the lines of prediction from the model, suggesting the TOPB can successfully be used to predict readiness for exercise.
AN INTEGRATED MODEL (FIGURE 2)

While the TOPB has received much attention and support, there is an important flaw associated with it. Namely, there is a complete lack of standardized assessment instruments with which to measure its constructs. Each researcher in each study using this theory "creates" his/her own measures for the constructs, relying on suggestions from past researchers and the theory's originators, but varying the content and structure of the questions as he sees fit. In contrast, the various theories discussed above that parallel the constructs included in the TOPB (i.e., decisional balance theory, self-efficacy) do have standardized instruments that have been used extensively in past research. Hence, integrating these theories seems to be a logical step.

After reading the descriptions of the various models presented above, it should become apparent that many of the constructs used in the decisional balance theory, self-efficacy theory, and the TOPB are conceptually similar, if not identical. Several other researchers have noted these similarities (e.g., Ajzen, 1991; Courneya, 1995; Godin et al., 1992). In particular, behavioral beliefs from the TOPB are conceptually similar to the pros and cons from the decisional balance theory. Both propose that a person's attitudes about a behavior will be determined by how he weighs the advantages and disadvantages associated with the behavior. Additionally, the construct of self-efficacy is conceptually identical to perceived behavioral control from the TOPB (Ajzen, 1991). Both of these constructs posit that a person's belief in
whether or not he has the ability to perform a behavior will influence whether he will actually carry out the behavior. Finally, when control beliefs have been assessed in past research on smoking, subjects have been asked about their ability to resist smoking in certain problematic situations. Subjects' confidence that they could resist smoking in specific situations likely to elicit cigarette smoking (i.e., social engagements, watching a ballgame) could be used to conceptualize the degree to which subjects believed they could control their behavior (i.e., control beliefs). This is very similar to the concept of temptations to smoke as discussed above in relation to self-efficacy.

Consequently, to remedy the lack of standardized instruments to measure constructs used in the TOPB, this project proposes to integrate the various theories described above, using standardized measures to replace the unstandardized constructs used in the TOPB. Figure 2 summarizes this integrated model. It posits that a person's perception of the pros and cons associated with smoking will affect their attitude towards smoking, which will in turn predict which stage of change he is in. A person's temptations to smoke will affect his beliefs that he can quit smoking, which also contributes towards predicting stage membership. Finally, the degree to which a person has significant others supporting his efforts to change will help to predict his cessation readiness.
When standardized measures are unavailable, the traditional approach to assessment used in past studies on the TOPB will be employed. Another variation in the traditional use of the TOPB centers around the predicted variable and the use of the 'intention' construct. Usually, in past research using the TOPB, intention to engage in a behavior is assessed then the actual behavior is measured over some period of time to determine if the model can predict actual behavioral engagement. In contrast, the integrated model presented in Figure 2 will be used to predict concurrent stage of change regarding smoking behavior and readiness for cessation. Because the stage of change assesses intention to change, the 'intention' construct was omitted, or, more accurately, incorporated into the stage of change measure. Although this is different from the majority of research on the TOPB, it is conceptually sound and avoids construct contamination and domain overlap.

**Figure 2: An Integration of the Theory of Planned Behavior, Decisional Balance Theory, Self-Efficacy, and Stress to Predict Stage of Change**
This project is very similar in basic design to the one discussed earlier conducted by Courneya (1995), which is the only published study to integrate the TOPB with stages of change. While Courneya predicted stage of exercise readiness and used measures devised specifically for the study, the present project will predict stage of smoking cessation readiness and will replace the original constructs with the theories discussed above. Once again, this is being done so standardized measures can be used to assess the constructs, thus maximizing the chance of accurate assessment, improving reliability and validity, and providing greater ease of replication.
A SUMMARY

Smoking continues to be a major health problem for Americans. More research is needed to improve efforts at identifying and modifying cognitive, behavioral, and environmental factors that contribute to smoking and smoking cessation. This is especially true for people low in SES.

Several theoretical models seeking to explain smoking and smoking cessation have received attention in the literature, including the transtheoretical model (i.e., stages of change), decisional balance theory, self-efficacy, and the TOPB.

A comparison between Figures 1 and 2 reveals that the basic structure of the proposed integrated model is almost identical to the structure of the TOPB. However, there are some differences that should be highlighted. Instead of using behavioral beliefs, perceived behavioral control, and control beliefs, the integrated model uses decisional balance, self-efficacy, and temptation theories. Essentially, the upper part of this model hypothesizes that a person’s intention to perform a behavior will be influenced by his/her attitude about the behavior, which is, in turn, influenced by the person’s assessment of the pros and cons associated with the behavior. If a person believes there are many pros to smoking and few cons, his attitude toward smoking will be positive and he will have low intention to quit. The middle part of the model states that if significant others in a person’s life believe he should quit smoking, he will be more likely to intend to quit. The lower part
of the model means that if temptations to smoke are high across a variety of situations, the person will likely believe he has little control over their smoking, and, therefore, will have low intention to quit. Finally, this model integrates the 'intention' construct of the TOPB with the predicted behavior in the form of the stage of change.
RESEARCH QUESTIONS

The present study investigated the following research questions:

1) Since the stages of change model has rarely been used with samples low in SES, and never with a sample of government-insured and indigent medical patients, a basic goal of this study was to investigate whether the stage of change distribution among a sample of government-insured and indigent medical patients differed from the distribution found in other populations reported in the literature (e.g., Velicer et al., 1995). In other words, are smokers who comprise this sample similar in distribution across the stages as smokers from other populations? While there is reason to expect the prevalence rate of smoking among this sample to be higher than the national average since they are predominately low in SES (e.g., Giovino et al., 1994), there was no empirical evidence to base hypotheses regarding stage distribution. Therefore, no ad hoc hypotheses were made.

2) Do the variables forming the integrated model described above and depicted in Figure 2 combine to predict stage membership? Based on the success of these variables to predict stage of change in other research, it was hypothesize that they should combine to predict significant variance in stage of change.

3) Do the individual variables that compose the model predict stage membership, and are there certain variables that are relatively better predictors than others? Past research indicates that self-efficacy is a
particularly salient predictor of both intention to quit and actual smoking cessation (e.g., Godin et al., 1992); hence, it was hypothesized that self-efficacy would be a strong predictor of stage membership. More specifically, self-efficacy was expected to increase with each successive stage with Precontemplators expected to have the lowest self-efficacy and Maintainers to have the highest. Temptation to smoke was expected to decrease with progressive stage membership, with people in the earlier stages reporting greater temptation to smoke than people in later stages. Past research also indicates that pros and cons are fairly consistent predictors of stage membership across a variety of behaviors (e.g., Prochaska et al., 1992); hence, pros and cons were also expected to be relatively good predictors of stage membership, especially when predicting movement from Precontemplation to Contemplation and from Contemplation to Action.

Specifically, evaluations of the pros of smoking were expected to decrease with each successive stage, with Precontemplators having the highest scores and those in Action and Maintenance having the lowest. Cons were expected to be lower for those in the Precontemplation stage versus those in the Action stage, as other studies have found (e.g., Prochaska et al., 1992).

Smoking attitudes and subjective norm have been studied less often than the other variables mentioned above, and, moreover, the studies using them have found varying results when predicting smoking behavior (e.g., Godin et al., 1992). Therefore, the relative strength of these variables to
predict stage membership was difficult to judge *ad hoc*. However, based on expectations derived the TOPB, subjective norm (social support for smoking) was expected to decrease with progressive stage membership, and attitudes towards smoking were expected to become more negative with progressive stage membership. These trends were expected to be most prominent when extremes in stage were compared (i.e., Precontemplation versus Maintenance).
METHODS

Participants

554 patients attending public primary care clinics from four separate sites in Louisiana were randomly selected to participate in a study investigating a variety of health risk factors supported by a Louisiana state grant and conducted through Pennington Biomedical Research Center. Of the total sample collected for this larger study, data collected on the 257 ever smokers (current smokers, ex-smokers) were used for the study outlined herein. The sites of data collection included Earl K. Long Medical Center Outreach Clinics, Baton Rouge General Medical Center, Conway Medical Center in Monroe, LA, and University Medical Center in Lafayette, LA. Only patients who were on some form of government-insurance (i.e., Medicaid, Medicare, or both) or who were indigent were chosen to be included in the study. Patients were a mix of rural and urban inhabitants.

All participants were older than 18.

Measures (See Appendix)

Decisional Balance. The decisional balance measure assessing smoking developed by Velicer and colleagues (1985) was used in the present study. It contains 20 items assessing the degree to which participants derive positive or negative feelings/consequences from smoking. Participants use a 5 point Likert format (1 = "not important" to 5 = "extremely important") to rate how important each statement is to their smoking behavior. The internal
consistency reliability coefficients are: Pro scale = .87; Con scale = .90.

Principal component analyses have been replicated and indicate the scales are stable across samples, providing evidence for sound construct validity (Velicer et al., 1985).

**Self-efficacy.** Self-efficacy was measured using a scale created by Velicer, DiClemente, Rossi, and Prochaska (1990). It consists of 20 items assessing how confident participants feel about their ability to resist smoking across numerous hypothetical situations. Participants rated their confidence levels on a 5 point scale (1 = "not at all confident" to 5 = "extremely confident"). Past research has indicated that this scale has adequate internal consistency coefficients (alpha = .83 to .95) and good construct validity (Velicer et al., 1990).

**Temptations.** The Temptations to Smoke scale is a measure used by DiClemente (1986) and Velicer et al. (1990). It assesses how tempted participants believed they would be in a variety of situations that past research has indicated frequently elicit smoking behavior, such as social situations, increased stress, and coffee breaks. It contains 20 items identical to those found in the Self-Efficacy measure described above. Respondents rate these items on a 5 point scale (1 = "not at all tempted" to 5 "extremely tempted"). Using the Temptations questionnaire in conjunction with the Confidence questionnaire is recommended by Velicer and colleagues (1990,
1993), the researchers responsible for the creation and initial studies of the two scales. Cronbach's alpha for Temptations to Smoke was .93.

Stages of Change. The Smoking Stage of Change questionnaire used in this study was designed by Velicer et al. (1993). Respondents indicate which description best characterizes themselves from a list of items assessing intentions and attempts to quit smoking. A smoker can fall into one of three categories: Precontemplation (not thinking about quitting), Contemplation (thinking about quitting in the next 6 months), and Preparation (planning to quit in the next 30 days and already made a recent quit attempt). Former smokers fall into one of two stages: Action (continuous cessation for greater than 1 day but less than 6 months) and Maintenance (continuous cessation for greater than 6 months).

Attitude. Since no standardized measure of attitude toward smoking was available, the Smoking Attitude scale was patterned directly after similar scales used in previous research (Godin et al., 1992). Respondents rated their attitudes toward smoking across several dimensions reflecting negative versus positive evaluations. The adjectives used were: useful — useless, harmful — beneficial, wise — foolish, bad — good, enjoyable — unenjoyable, boring — interesting, pleasant — unpleasant, and stressful — relaxing. Respondents use a 7 point Likert scale with each end anchored with the adjective pairing listed above. Past studies have yielded respectable Cronbach alphas (i.e., alpha = .86) for similar measures of attitude toward smoking (Godin et al., 1992).
Crohbach’s alpha was computed, revealing an alpha of .83 and indicating acceptable internal consistency reliability.

**Subjective Norm.** Since no standardized measure of subjective norm is available, the subjective norm measure was based on Azjen’s (1985; 1991) original conceptualization of this construct. The method in which the questions are worded in past research using this construct are fairly consistent across studies. They assess the degree to which participants believe important people in their lives support their cessation efforts, including their best friend, their significant other, and their doctor. Crohbach’s alpha was computed for this measure, yielding an alpha of .70. While this score is in the low range, this is not unexpected given that the scale is composed of only three items.

**Validity Measures**

Since this study used only self-report, in order to help account for common-method bias two measures taken from the larger study in which this study was embedded were used as discriminant measures.

**Self-efficacy (Exercise).** This measure was similar in format to the self-efficacy measure for smoking and consisted of 5 items assessing confidence in one’s ability to exercise across a variety of situations. It has demonstrated adequate internal consistency (alpha = .82 and .76) and test-retest reliability over a two week period of .90 (Marcus, Selby, Niaura, & Rossi, 1992).
Self-efficacy (Dietary Fat). This measure was also similar in format to the self-efficacy measure for smoking and consisted of 12 items assessing confidence in one's ability to restrict dietary fat intake across a variety of situations. Research suggest's adequate internal consistency (alpha = .88) (Rossi, Green, Reed, Rossi, Prochaska, & Velicer, 1994).

Marlowe-Crowne. In order to assess the impact of social desirability on subjects responses, the Marlowe-Crowne (1960) scale was used. This inventory is a widely used measure assessing one's propensity to answer questions in a socially desirable way and has been used to assess this potentially confounding construct. The scale consists of 20 true-false items and has been shown to have acceptable internal consistency reliability (Marlowe & Crowne, 1960).

Procedure

Participants were randomly selected while attending scheduled clinic appointments. Participants who agreed to participate signed an informed consent which included basic information regarding the purpose of the study. This information did not describe the study's hypotheses and was written so as not to introduce experimenter-demand bias. The informed consent also reassured participants that their medical services would not in any way be impeded or adversely affected by participation or non-participation in this study so as to avoid coercion. Participants were then interviewed using a variety of health risk behavior measures and questionnaires related to models.
of behavior change, including those described above. Participants were provided with $25 compensation for participation in this study. All responses were kept confidential and names were not used in data entry. Only patients who were government-insured or indigent were selected for the present study.
RESULTS

Phase I

Preliminary descriptive analyses were conducted to yield information on demographic composition, smoking prevalence, and means and standard deviations of scale scores.

Demographic Composition. Demographics were derived for both the sample that participated in the larger study (n = 554) and the subsample of ever smokers who were used for the present study (n = 257). The demographics of the ever smokers were virtually identical to those obtained for the larger sample. The study sample's (n = 257) mean age was 47.17 (s.d. = 12.84). Approximately 50.6% were African American, 72.8% female, 37.7% unemployed, and 40.9% married. The mean years of education completed was 10.61 (s.d. = 2.90), and 58.8% did not complete high school. The mean household income was $964.32 per month (s.d. = $670.79), indicating that this sample was composed predominately of low-income persons. The majority had no medical insurance (75.5%), while 24.5% had Medicaid, Medicare, or both. A summary of demographic information is presented in Table 1.

As summarized in Table 2 below, there appears to be an under-representation of patients from the Baton Rouge General Family Practice Clinic since this clinic services a high number of patients with private insurance and attempts were made to recruit government-insured and indigent
Table 1: Demographic Data

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>%</th>
<th>Mean (S.D.)</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE</td>
<td></td>
<td></td>
<td>47.17 yrs (12.84)</td>
<td>18-87</td>
</tr>
<tr>
<td>EDUCATION</td>
<td></td>
<td></td>
<td>10.61 yrs (2.90)</td>
<td>1-18</td>
</tr>
<tr>
<td>Completed HS</td>
<td>106</td>
<td>41.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did Not Complete HS</td>
<td>151</td>
<td>58.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INCOME (HOUSEHOLD)</td>
<td></td>
<td></td>
<td>$964.37/mo (760.79)</td>
<td>0-$3962/mo</td>
</tr>
<tr>
<td>GENDER</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>70</td>
<td>27.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>187</td>
<td>72.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RACE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>130</td>
<td>50.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>124</td>
<td>48.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
<td>1.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MARITAL STATUS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>53</td>
<td>20.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>105</td>
<td>40.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Separated</td>
<td>21</td>
<td>8.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Divorced</td>
<td>50</td>
<td>19.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Widowed</td>
<td>28</td>
<td>10.9</td>
<td></td>
<td></td>
</tr>
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</table>

(table con’d)
<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>%</th>
<th>Mean (S.D.)</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMPLOYMENT STATUS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>98</td>
<td>38.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>97</td>
<td>37.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retired</td>
<td>20</td>
<td>7.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disabled</td>
<td>40</td>
<td>15.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>2</td>
<td>.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HEALTH INSURANCE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medicaid</td>
<td>31</td>
<td>12.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medicare</td>
<td>17</td>
<td>6.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>194</td>
<td>75.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medicaid and Medicare</td>
<td>15</td>
<td>5.8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

medical patients. These participants were kept in the study despite the small number of subjects recruited from this clinic since they consisted of the group of interest. Distribution among the remaining three sites appears roughly equivalent.

The three geographical sites (i.e., Baton Rouge, Monroe, Lafayette) were compared to determine if there were differences in demographics and scale scores, revealing that the sites appeared demographically similar and did not differ in their average scale scores (p < .05).

Smoking Prevalence. With regards to smoking cigarettes, results indicated that approximately 29.4% of those agreeing to participate in the
larger sample \((n = 554)\) currently smoked. Approximately 23.2\% of the larger sample smoked at one time, but have quit, and 47.4\% have never

**Table 2: Distribution of Participants Across Data Collection Sites**

<table>
<thead>
<tr>
<th>CLINIC</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earl K. Long outreach clinics, Baton Rouge, LA</td>
<td>31.5</td>
</tr>
<tr>
<td>Baton Rouge General Family Practice Clinic</td>
<td>8.2</td>
</tr>
<tr>
<td>Conway Medical Center, Monroe, LA</td>
<td>26.1</td>
</tr>
<tr>
<td>UMC Family Practice Clinic, Lafayette, LA</td>
<td>35.0</td>
</tr>
</tbody>
</table>

smoked. Of those ever smokers used in the present study \((n = 257)\), approximately 50\% were current smokers and 50\% were ex-smokers.

**Means, Standard Deviations, Range.** The mean, standard deviations, and range for the variables used in this study are presented in Table 3. As no normative data has yet been published for these scales, it is difficult to determine how the sample relates to the general population across these variables.

**Phase II**

In order to investigate the role of demographic predictors in this sample, one-way ANOVAs were computed between the stages of change and the demographic variables that were expressed as continuous variables: age, years of education, and total income. Chi-square analyses were used for those expressed as discrete variables: sex, race, high school completion, occupational status, insurance status, and marital status. Additionally, other
potential confounds were investigated by examining the relation between the validity-check measures and stage of change.

Table 3: Means, Standard Deviations, and Range of Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean (S.D.)</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMODBPRO</td>
<td>20.73 (9.71)</td>
<td>10-46</td>
</tr>
<tr>
<td>SMODBCON</td>
<td>35.35 (9.04)</td>
<td>10-50</td>
</tr>
<tr>
<td>SMOSELFSE</td>
<td>69.35 (28.71)</td>
<td>20-100</td>
</tr>
<tr>
<td>SMOTEMP</td>
<td>51.83 (27.23)</td>
<td>20-100</td>
</tr>
<tr>
<td>SMOATT</td>
<td>49.17 (9.37)</td>
<td>8-56</td>
</tr>
<tr>
<td>SMOSUBNO</td>
<td>6.36 (1.14)</td>
<td>1-7</td>
</tr>
</tbody>
</table>

SMODBPRO = Decisional Balance, Pro Scale  
SMODBCON = Decisional Balance, Con Scale  
SMOSELFSE = Self-efficacy  
SMOTEMP = Temptations to Smoke  
SMOATT = Smoking Attitudes  
SMOSUBNO = Subjective Norm

Demographic Predictors. Results from one-way ANOVAs indicated that participants' ages were significantly different between the various stages, $F(4,256) = 8.99, p < .0001$. More specifically, a Tukey's Honestly Significant Difference post-hoc analysis indicated that participants in the Maintenance stage were older than participants in Precontemplation, Contemplation, and Preparation (i.e., current smokers). Chi-square analysis revealed that gender was also differentially distributed across stage, with a larger percentage of males in the Maintenance stage than females, $\chi^2(4) = 9.66, p < .05$. Females were more likely to be in the Precontemplation and
Contemplation stages than males. The remaining demographic variables were not significantly different across stage (p > .05).

Response Bias Confounds Check. Because all of the variables used in the study were found to be significant and all were assessed using the same format (i.e., self-report), this raised the question as to whether the results may have been influenced by a response bias introduced due to the common method of assessment. Or, in other words, perhaps people among different stages just differed in their questionnaire-taking styles, and this difference is actually the driving force behind the relations observed rather than genuine differences in the constructs measured. To test this, the relation between stages of change and the two validity-check scales, which were unrelated to smoking, was investigated. If these unrelated scales could predict smoking stage of change, it is possible that a response bias may be present. The ANOVAs revealed that neither variable was a significant predictor of smoking stage of change (p > .05), thus providing support that the results obtained with the 6 smoking-related variables were not due solely to a response bias or shared method bias. Additionally, social desirability as assessed by the Marlowe-Crowne (1960) was not a significant predictor of stage of change (p > .05), suggesting that subjects did not respond to questions regarding intent to stop smoking in a socially desirable manner.
Phase III

To answer Research Question #1 and determine if differences exist between the study sample and the general population regarding the distribution of smokers across stage of change, percentages in each stage based on the study sample were compared to data on stage of change among smokers from the general population (Velicer et al., 1995).

**Comparison of Stage Distribution.** Results indicated that 38.5% of this sample of smokers were not considering quitting smoking in the next 6 months. Approximately 39.2% were considering quitting in the next 6 months, but have not had a quit attempt in the past year, while 22.3% of smokers are planning to quit in the next 30 days and have made a quit attempt in the past year. Smokers among the different stages of change (i.e., Precontemplation, Contemplation, Preparation) did not differ significantly in the average number of cigarettes they smoked per day, $F (2,135) = .6305, p > .05$.

<table>
<thead>
<tr>
<th>Stage of Change</th>
<th>N</th>
<th>% of Total Sample</th>
<th>% of Smokers, Sample</th>
<th>% of Smokers, Gen Pop.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precontemplation</td>
<td>50</td>
<td>19.5</td>
<td>38.5</td>
<td>40.1</td>
</tr>
<tr>
<td>Contemplation</td>
<td>51</td>
<td>19.8</td>
<td>39.2</td>
<td>41.9</td>
</tr>
<tr>
<td>Preparation</td>
<td>29</td>
<td>11.3</td>
<td>22.3</td>
<td>17.9</td>
</tr>
<tr>
<td>Action</td>
<td>23</td>
<td>8.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance</td>
<td>104</td>
<td>40.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Phase IV

To answer Research Question #2, a multivariate analysis of covariance (MANCOVA) was conducted to explore whether the combined variables could successfully differentiate between stages of change (after accounting for the effects of age and sex).

**MANCOVA.** The MANCOVA revealed that the six variables, when combined as a whole, successfully predicted stage membership even after the effects of age and sex were accounted for, $F(4,240) = 11.67, p < .001$. Univariate $F$-tests further revealed that each of the six variables individually predicted stage membership as well ($p < .001$). (The individual one-way ANCOVAs [partiallying out the effects of age and sex] and Tukey post-hoc tests for each of the 6 variables are presented in Phase V.)

Phase V

In order to answer Research Question #3, further analyses consisting of one-way ANCOVAs and Tukey’s Honestly Significant Difference post-hoc tests were conducted on those individual variables which were shown to be significant predictors of stage of change in the MANCOVA analysis (i.e., $p < .05$). This was done in order to further elucidate which stages were differentiated by which variables and to determine which variables were better at differentiating stage of change.

**Self-efficacy.** A one-way ANCOVA was conducted to test for differences in self-efficacy across the stages of change. Results indicated that
self-efficacy significantly differentiated participants across the different stages of change, $F(4, 250) = 115.30, p < .001$. Tukey post-hoc comparison results indicated Precontemplators had significantly lower levels of self-efficacy than all other stages of change ($p < .05$). Contemplators and Preparers had significantly lower levels of self-efficacy than those in Action and Maintenance stages (i.e., ex-smokers) ($p < .05$). Finally, ex-smokers who had not yet reached the six month abstinence mark (i.e., those in the Action stage) had significantly lower self-efficacy scores than ex-smokers who had surpassed the six month mark ($p < .05$). As can be seen from the summary Table 5 below, self-efficacy differentiated between nearly every stage.

**Table 5: Tukey Post-Hoc Means Comparisons on Self-Efficacy Scores**

<table>
<thead>
<tr>
<th>Mean</th>
<th>SOC</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>39.41</td>
<td>1</td>
<td></td>
<td>*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>49.34</td>
<td>2</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>49.86</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>79.74</td>
<td>4</td>
<td>*</td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>96.70</td>
<td>5</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

SOC = Stage of Change  
1 = Precontemplation  
2 = Contemplation  
3 = Preparation  
4 = Action  
5 = Maintenance  
* = significantly different at $p < .05$
**Temptations.** A one-way ANCOVA was conducted to test for differences in Temptation scores across the stages of change. Results indicated that Temptation significantly differentiated participants across the different stages of change, $F(4, 249) = 74.07, p < .001$. Tukey post-hoc comparison results indicated participants in the Maintenance stage, or long-term abstainers, had significantly lower levels of Temptation than all other stages of change ($p < .05$). Short-term abstainers, or those in the Action stage, experienced significantly less Temptation than current smokers in all three stages (i.e., Precontemplation, Contemplation, and Preparations) ($p < .05$). See summary of these results in Table 6 below.

**Table 6: Tukey Post-Hoc Means Comparisons on Temptation Scores**

<table>
<thead>
<tr>
<th>Mean</th>
<th>SOC</th>
<th>5</th>
<th>4</th>
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<td>69.36</td>
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<td>*</td>
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<tr>
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<td>75.90</td>
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</tbody>
</table>

SOC = Stage of Change
1 = Precontemplation
2 = Contemplation
3 = Preparation
4 = Action
5 = Maintenance
* = significantly different at $p < .05$

**Pros.** A one-way ANCOVA was conducted to test for differences across the stages of change in Pros scores. Results were significant for the
Pros, $F(4,250) = 37.96, p < .001$. Tukey post-hoc analyses revealed that Maintainers appraised the Pros of smoking as significantly less important than participants in all other stages ($p < .05$). Participants in the Action stage appraised the Pros of smoking as significantly less important than Precontemplators and Contemplators ($p < .05$). Finally, Preparers appraised the Pros of smoking significantly lower than Precontemplators ($p < .05$).

See summary of these results in Table 7 below.

Table 7: Tukey Post-Hoc Means Comparisons on Pro Scores

<table>
<thead>
<tr>
<th>Mean</th>
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</tbody>
</table>

SOC = Stage of Change
1 = Precontemplation
2 = Contemplation
3 = Preparation
4 = Action
5 = Maintenance
* = significantly different at $p < .05$

Cons. The ANCOVA analysis was also significant for the Cons, $F(4,251) = 10.71 p < .001$. Tukey post-hoc analyses revealed that Maintainers appraised the Cons of smoking as significantly less important than participants in all other stages ($p < .05$). Also, Contemplators
appraised the Cons of smoking as significantly greater than Precontemplators (p < .05). See summary of these results in Table 8 below.

<table>
<thead>
<tr>
<th>Mean</th>
<th>SOC</th>
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<tr>
<td>40.76</td>
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</table>

SOC = Stage of Change
1 = Precontemplation
2 = Contemplation
3 = Preparation
4 = Action
5 = Maintenance
* = significantly different at p < .05

Smoking Attitude. The ANCOVA conducted on Smoking Attitude was significant, F (4,250) = 15.0, p < .001. Tukey post-hoc analyses revealed that Precontemplators and Contemplators exhibited more positive attitudes toward smoking than those in Preparation, Action, and Maintenance (p < .05). Additionally, Preparers exhibited significantly more favorable attitudes towards smoking than those participants in Maintenance (p < .05). See summary of these results in Table 9 below.

Subjective Norm. The ANCOVA conducted on Subjective Norm was significant, F (4,250) = 12.19, p < .001. Tukey post-hoc analyses revealed that Precontemplators and Contemplators reported greater support
Table 9: Tukey Post-Hoc Means Comparisons on Smoking Attitude Scale

<table>
<thead>
<tr>
<th>Mean</th>
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</tr>
</tbody>
</table>

SOC = Stage of Change
1 = Precontemplation
2 = Contemplation
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4 = Action
5 = Maintenance
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for smoking from significant others and less support/encouragement for cessation from their physicians than those in Action and Maintenance (p < .05). See summary of these results in Table 10 below.
Table 10: Tukey Post-Hoc Means Comparisons for Subjective Norm

<table>
<thead>
<tr>
<th>Mean</th>
<th>SOC</th>
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<tr>
<td>6.88</td>
<td>5</td>
<td>*</td>
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</tr>
</tbody>
</table>

SOC = Stage of Change
1 = Precontemplation
2 = Contemplation
3 = Preparation
4 = Action
5 = Maintenance
* = significantly different at p < .05
DISCUSSION

The majority of the study's hypotheses were supported. As predicted, the integrated model using variables from decisional balance theory, self-efficacy theory, and the TOPB combined to predict a significant amount of variance in smoking stage of change. Furthermore, each of the 6 variables composing the model predicted stage membership when analyzed individually. The degree to which they predicted stage membership differed markedly, however. Self-efficacy proved most powerful, differentiating almost every stage from all the other stages, which is consistent with results from other studies (e.g., Godin et al., 1992). Pros, cons, smoking attitudes, temptations, and subjective norm also differentiated between some but not all stages and were less consistent than self-efficacy. As a whole, results suggested that variables derived from decisional balance theory and TOPB can be important determinates of a person's readiness to quit smoking and/or his success at abstinence but self-efficacy seems most important.

Examination of the sample's demographic data revealed it to be composed predominately of low-income, poorly educated, uninsured, females. Analyses were conducted to explore whether these demographic indicators were related to smoking stage of change, revealing that both age and gender were significant predictors of stage. Participants in the Maintenance stage (i.e., long-term abstainers) were older than participants in the three earliest stages. While previous studies on age as a predictor of
stage of change differ in their findings (e.g., Velicer et al., 1995), other research has shown that older people are more likely to quit smoking than younger people (Giovino et al., 1994), which is consistent with the observed age-related trend in stage distribution. Gender was also differentially distributed across stage, with a larger percentage of males as compared to females having achieved long-term abstinence. Females were more likely to be in the earlier stages (i.e., Precontemplation and Contemplation). There were no other demographic predictors of stage of change.

Approximately 29% of the total sample collected for the larger study in which this study was embedded were current smokers. Recent national figures yielded a smoking prevalence of 25.4% of all Americans (CDC, 1994b). This suggested that the study sample consisted of a greater percentage of smokers than is found in the general population. However, this elevated prevalence was expected and is consistent with previous research demonstrating greater risk for smoking among samples low in SES (Giovino et al., 1994). The national smoking cessation goals outlined in Healthy People 2000 include reducing the overall smoking prevalence in the general population to 15%, representing an overall decrease of 19% from the baseline rate of 34% in 1987. As a group, subjects in the present study appear to be moving towards reaching the national smoking cessation objectives for the year 2000, but they remain slightly behind the rest of the
nation and remain a substantial distance from reaching the recommended 15% prevalence rate.

Results indicated that, among people who have ever smoked, the number of people who have quit smoking in this sample is roughly equivalent to the number of people who are currently smoking. Of those who continued to smoke, 38.5% were in the Precontemplation stage, meaning they were not considering quitting smoking and were satisfied with their current status as smokers. These people are not likely to quit smoking in the near future (Prochaska, DiClemente, & Norcross, 1992). Another 39.2% were in the Contemplation stage, or were considering quitting in the next 6 months but had not made a quit attempt in the past year. Contemplators have questionable or half-hearted commitment to actual cessation. Research supports this description, showing that only a minimal percentage of Contemplators actually quit smoking in the next 6 months when tracked over time (Velicer et al., 1985) and only a small percentage will successfully quit when given a smoking cessation program (Prochaska, DiClemente, & Norcross, 1992). Only 22.3% of current smokers appeared to be serious about quitting since they had made a quit attempt in the past year and they intended to quit smoking in the next month (i.e., they were in the Preparation stage).

These figures on the stage distribution of the present sample were compared to the distribution of smokers derived from a representative sample
of smokers gathered from across the United States and reported by Velicer and colleagues (1995) (see Table 4). Surprisingly, this comparison revealed that this study's sample was composed of slightly more smokers in the Preparation stage than the national norm (i.e., 22.3% versus 17.8%, respectively). Research suggests that it is this 22.3% who has actually had a quit attempt in the past year and who intend to quit smoking in the next 30 days who are most likely to succeed at behavior change when participating in active behavioral management programs (Prochaska & DiClemente, 1992; Prochaska, DiClemente, & Norcross, 1992). This implies that, although the majority of the current sample did not appear committed to quitting smoking in the near future, a larger than expected percentage reported they were serious about quitting. Efforts for implementing active cessation programs should target this subsample to maximize efficiency and outcome. Moreover, past research also indicates that other less "active" interventions may be used to "move" people from earlier stages to later stages in a cost effective manner (Pallonen, Leskinen, Prochaska, Willey, Kaariainen, & Salonen, 1994), thus priming them for later efforts at cessation. For example, one study used stage-specific, mail-out manuals to differentially target smokers among the different stages and found that this tailored intervention resulted in favorable cessation rates (Pallonen et al., 1994). Therefore, interventions designed to reach those in the Precontemplation and Contemplations stages could be implemented with the goal of getting these smokers to either
consider quitting, committing to quitting in the near future, and/or actually 
elicit preliminary quit attempts, such as short-term, temporary cessation; 
decreasing the number of cigarettes smoked; or changing brands to lower-
nicotine cigarettes. Interestingly, however, current smokers among the 
different stages of change (i.e., Precontemplation, Contemplation, 
Preparation) did not differ significantly in the average number of cigarettes 
they smoked per day, which suggests that an intention to quit does not 
necessarily correlate with current attempts at reducing the number of 
cigarettes smoked.

Analyses aimed at determining whether the variables derived from the 
TOPB, decisional balance theory, and self-efficacy theory could successfully 
differentiate between stage of change yielded interesting and promising 
results. Not only was the entire model successful in predicting stage 
membership, each of the 6 variables studied — pros, cons, self-efficacy, 
temptations, attitude, and subjective norm — was show to individually predict 
stage membership as well. However, some variables clearly did a better job 
at predicting stage of change than others, and they appeared to have differing 
predictive power depending upon which part of the change continuum one 
was comparing (i.e., comparing Precontemplation to Contemplation versus 
comparing Action to Maintenance). First each variable will be discussed 
individually, then an integration and summary will follow.
Self-efficacy

Consistent with past research, analyses revealed self-efficacy to be a powerful predictor of stage of change in this sample. Self-efficacy differentiated each stage from virtually every other stage and was the most consistent of all the variables at predicting across stage. Self-efficacy increased steadily from Precontemplation to Maintenance. More specifically, Precontemplators had significantly lower self-efficacy than all other stages of change, while Contemplators and Preparers had significantly lower levels of self-efficacy than those in Action and Maintenance stages (i.e., ex-smokers), but significantly higher scores than Precontemplators. Furthermore, ex-smokers who had not yet reached the 6 month abstinence mark (i.e., those in the Action stage) had significantly lower self-efficacy scores than ex-smokers who had surpassed the 6 month mark, who exhibited the highest self-efficacy. Hence, each successive stage corresponded to a significant increase in confidence in one’s ability to abstain, with the one exception of moving from Contemplation to Preparation, which corresponded to a nonstatistically significant increase.

While suggestive, without further information these results (and the results of most of the other variables reported herein) can be interpreted in either of two ways. First, it could mean that as a person becomes more confident in their ability to abstain from smoking, they are more likely to move forward to the next stage of change, or, in other words, they are more
likely to either intend to quit smoking or actually stop. Moreover, those
person's with the highest confidence in their ability to quit were the most
likely to have moved to the point of maintaining their abstinence on a long-
term basis. Based on this interpretation, increasing a person's perception of
control over their smoking behavior and increasing their cross-situational
confidence regarding abstinence may impart a greater commitment to quit
and may allow them to actually resist the considerable temptations and
cravings known to accompany cessation. A person who simply does not
believe he can quit, more than likely will not decide to quit and,
consequently, will never achieve successful cessation. In this first
interpretation, then, changes in the person's cognition precede changes in the
person's behavior. Before a person commits to change or actually makes a
cessation attempt, the person must become more confident that he can
succeed; the more confident he is that he can succeed, the more likely he is
to actually succeed.

The second interpretation is similar to the first but the arrow between
cognition and behavior is reversed. Perhaps it is the person's behavior of
attempting to quit and/or of telling himself and others that he intends to quit
smoking that helps him to garner the self-confidence he needs to quit. The
key may lie in the successive behavioral steps of attempting to quit and/or
actually successfully abstaining that increases the person's confidence in his
ability to quit. In other words, the actual behavior of not smoking causes the
person to feel more confident that he can remain an abstainer. This may in turn further buttress the person's cessation efforts. However, the key to this interpretation is that, before a person can become confident in his ability to quit smoking, he must take small steps that can be interpreted as miniature "successes." Hence, to effect cognitive change, behavior changes, however small, must have already begun, even if that simply means acknowledging to others that one intends to quit some time in the future (i.e., Contemplators). Of course, it is entirely possible that both interpretations are valid, or at least have some partial validity. It is also possible that different people follow different patterns. This is a question for future research.

Temptation

Results concerning temptations to smoke were similar to those found with self-efficacy, though its ability to differentiate stages of change was noticeably less. Analyses revealed that participants who had quit smoking, regardless of whether they were short-term or long-term abstainers, reported significantly lower levels of temptation to smoke than participants who continued to smoke. This finding can likewise be interpreted in two ways. First, it could mean that as the temptation to smoke decreased, a smoker is more likely to quit smoking. It is simply more likely that a smoker who finds many situations highly tempting will not be as likely to quit smoking when compared to one who finds the temptation less intense, persistent, and/or pervasive. This means that cognitive change must precede behavioral
change. The second interpretation reasons that the decrease in temptations occurs as a result of the cessation. Much research indicates that the physiological and psychological cravings to smoke decrease once a smoker stops smoking for a period of time, probably as a result of a combination of factors, including nicotine detoxification, behavioral extinction, altered lifestyle patterns, and improved coping mechanisms (Fisher, Haire-Joshu, Morgan, Rehberg, & Rost, 1990). This second interpretation maintains that cessation precedes a reduction in temptation and, consequently, temptations to smoke will probably not decrease significantly until cessation occurs. Interestingly, and supportive of this second interpretation, temptations did not successfully differentiate between the various stages among current smokers (i.e., Precontemplation, Contemplation, Preparation). This means that people who were serious about quitting found smoking just as tempting as did smokers who did not intend to quit. In other words, all current smokers found smoking to be highly tempting. It wasn’t until smokers became ex-smokers that they reported a significant decrease in temptations to smoke, suggesting that the act of quitting may be important in reducing temptations.

Pros

Past research also demonstrates that evaluations of the pros, or positive aspects, of smoking are important predictors of stage. Results from this study indicated that long-term abstainers appraised the positive aspects of smoking as significantly less important than participants in all other stages,
while short-term abstainers appraised the pros of smoking as significantly less important than Precontemplators and Contemplators. This means, essentially, that once a person stops smoking, he evaluates the advantages of smoking as less important than people who continue to smoke, and, furthermore, that as time passes and the person maintains abstinence, their evaluations of the positive aspects of smoking further decrease significantly. Analyses also indicated that Preparers appraised the pros of smoking as significantly less important than Precontemplators, suggesting that those people who were still smoking but were on the verge of quitting had begun to lower their estimations of the advantages of smoking. Overall, then, these results suggest that a decrease in the evaluation of the benefits associated with smoking corresponds to greater readiness to change, a greater likelihood of starting cessation, and a greater likelihood of maintaining cessation. Current smokers, especially those who do not intend to quit smoking, continue to focus on the benefits derived from smoking, such as enhanced relaxation, stress management, and opportunity for socialization. This becomes less important to those who are about to quit, and continues to degrade in value the longer a person is an ex-smoker. As with self-efficacy and temptations, however, the preeminence of cognitive versus behavioral change is debatable.
Cons

In a similar vein, Contemplators appraised the cons of smoking as of significantly greater importance than Precontemplators. This compliments the findings with the pros of smoking. As people become more ready for change and begin to think about quitting, they appraise the negative impact of smoking, such as increased health risks, bad breath, and expense, as more salient. An interesting finding, however, is that long-term abstainers appraised the negative consequences of smoking as significantly less important than participants in all other stages. On first consideration, one would expect that people who have quit smoking would rate the fact that cigarettes are associated with numerous negative consequences as an important factor in their decision not to smoke, but that is not what this sample of long-term abstainers reported. This reversed-trend may reflect a long-term abstainer’s tendency to quit evaluating the cons as important for continued abstinence since he has already achieved his long-term behavioral goal. In other words, the point of whether or not smoking is bad or good has become moot to long-term abstainers. Other research has demonstrated this same trend (e.g., Prochaska et al., 1994), finding that evaluations of both pros and cons decrease in later stages.

Interestingly, while cons differentiated between Precontemplators and Contemplators, pros did not, and while pros differentiated between Precontemplators and Preparers, cons did not. This seems to imply that
early decisions to quit might be based on the recognition that smoking is bad but smokers are not really serious about quitting until they acknowledge that the positive aspects of smoking are not as important as they once thought they were.

**Attitude**

A variable included in the theory of planned behavior but which has not been studied in past stage of change research is attitude toward smoking. Results indicated that smokers who do not appear serious about quitting (i.e., those in Precontemplation and Contemplation) evaluate smoking more favorably than those who seriously intend to quit (i.e., those in Preparation) or who have already quit (i.e., those in Action and Maintenance). Put simply, satisfied smokers believe smoking is good, while dissatisfied smokers and former smokers think it is bad. Once again, it is difficult to determine whether this cognitive shift is primary or secondary to actual behavior change.

**Subjective Norm**

Another variable from the theory of planned behavior that has not received much attention in the smoking literature is subjective norm. The findings regarding subjective norm were less consistent and the least impressive of all the variables studied. Basically, current smokers who are not serious about cessation report that the people around them are more supportive of their habit than people who have already quit. Interestingly,
those in earlier stages believe their physicians to be less supportive of cessation than those who have already quit. This finding, taken in combination with other research that shows less than 50% of current smokers report that their physician has ever advised them to quit smoking (Frank, Winkleby, Altman, Rockhill, & Fortmann, 1991), implies that physicians may need to increase their efforts at encouraging their smoking patients to quit.

Since third-person reports were not obtained, it is difficult to know how accurate smokers were in their estimates of how supportive people in their environment were in their efforts to quit. However, since the person is most likely to act on their perception rather than objective reality, this problem is rendered inconsequential.

Integration

Overall, these results suggest that similar cognitive processes may characterize smokers and ex-smokers regardless of socio-economic status. Furthermore, by investigating which variables differentiate participants in directly adjacent stages, the relative importance of the variables to the progression from one stage to the next can be further investigated. In other words, if one looks at which variables specifically differentiated between Precontemplation and Contemplation, the variables that may be the most important in such a transition can be determined. These variables may or may not be the same ones important in transitioning from Action to
Maintenance. Viewing the results in this way reveals interesting patterns not otherwise readily apparent.

Based on such a comparison, it appears that one of the very first steps a person must take toward becoming an ex-smoker is to begin believing he has the ability to actually quit, which is represented by the fact that moving from Precontemplation to Contemplation corresponds to a significant increase in self-efficacy. Conversely, it does not appear that people ready to quit smoking differ in how tempted they are (they are as tempted as those who report no desire to quit), but, rather, they differ in how confident they are that they can resist the temptation. The temptation remains but they are more likely to feel they can fight it successfully and are therefore more ready to quit. This is supported by the fact that Preparation is not different from Contemplation and Precontemplation on temptation but it is on self-efficacy. Hence, if may not be the degree of temptation that a smoker feels that influences him to consider quitting but, rather, how confident he feels he can resist the temptation. The change in temptation comes after he has begun to quit.

Another preliminary cognitive step appears to lie in the smoker’s increased awareness of the disadvantages and problems associated with smoking. People who do not intend to quit smoking are apparently either unaware, unconcerned about, or in denial of the fact that smoking is associated with numerous adverse effects. Not surprisingly, it is not likely
that such a person will want to quit, and, therefore, not very likely that he will succeed even if put through an active smoking cessation program. But once smokers begin to acknowledge the adverse effects, they appear to be more motivated to consider quitting.

In sum, then, when people begin to take notice of the disastrous consequences of smoking and begin to believe that their may be some possibility that they have the ability to actually quit, then they begin to make commitments, though not necessarily strong ones, to quit smoking. They begin to entertain the idea, begin to acknowledge the possibility of becoming an ex-smoker. However, the smoker who has endorsed such preliminary commitments without actually having taken active behavioral steps to quit still has a long way to go since they may continue to view smoking as good, (or at least, as not bad), perhaps because he probably still views the pros associated with smoking as very important. Also, he may still be very tempted to smoke, and, though the confidence it takes to quit is budding, his confidence has not grown strong enough for him to believe he can actually resist these considerable temptations. The most important early changes appear to lie in the fact that he has begun to take notice of the cons and is beginning to have some rudimentary confidence in himself.

Moving from having a half-hearted commitment to quit smoking to becoming seriously committed to cessation seems to be associated with an increase in the overall negative evaluation of smoking behavior, as evidenced
by the fact that Contemplators and Preparers differed in their attitudes toward smoking, with Preparers viewing smoking significantly less favorably than Contemplators. Additionally, devaluation of the importance of the advantages of smoking and a further increase in overall negative attitudes toward smoking appear important to moving the person to a sincere commitment, since these variables successfully differentiate between Precontemplation and Preparation. At this point in the process of change, then, it seems that the smoker is finally viewing smoking as an undesirable, unwanted, bad habit that needs to change; however, he remains highly tempted and does not necessarily report that he has much support from people around him, as evidenced by no significant differences between temptation and subjective norm between current smokers of different stages. Additionally, though his confidence is increasing, he may not have achieved the requisite confidence level it takes to actually quit; he is on the proverbial fence.

Finally, the next step from being prepared to quit and actually quitting seems to be characterized by a significant decrease in the temptation to smoke and a further increase in the confidence in one's ability to abstain. Somehow, the person must get to the point that he believes he can resist the temptation to smoke. The transition to becoming a long-term ex-smoker is likewise associated with a further devaluation of the pros of smoking, a decrease in the temptation to smoke, and a further increase in the confidence
that one can remain abstinent. One’s confidence appears to build the longer one has quit.

Taken as a whole, the results reported herein yield the following profile of people who are successful, long-term abstainers: they are confident in their ability to resist smoking across a variety of situations; they no longer find smoking very tempting; they view both the pros and cons of smoking as of little importance; they evaluate smoking as bad and disadvantageous; and, they report that people around them support their cessation. Conversely, people who are current smokers who do not intend to quit are just the opposite: they do not have much confidence in their ability to resist smoking; they are very tempted to smoke across a variety of situations; they view the pros of smoking as more important than the cons; they view smoking as good and acceptable; and, they report that the people around them support their smoking habit.

What, then, does the smoker who is ready to change look like? This person reports a sincere intention to quit in the near future and has made at least one rudimentary quit attempt in the past year. However, he is likely to be in a state of transition and is still likely to report that he finds smoking tempting and is not fully confident that he can resist smoking, but has relatively more confidence than someone who does not have a serious commitment to quit or who has not tried to quit in the past. Some other cognitive changes are evident in that he is likely to evaluate the disadvantages
of smoking as more important than the advantages of smoking. Finally, his overall attitude towards smoking is not as positive as those who have not made a quit attempt, but remains more positive than those who have already quit (i.e., his attitude toward smoking is changing but he still does not yet view smoking as all bad).

Treatment Implications

This research, when integrated with past research, continues to indicate a need for tailored treatment plans. What will be effective for those in Preparation may not be effective for those in Precontemplation. As mentioned earlier, past research has used individually tailored mail-out manuals and pamphlets or computerized presentations to differentially target people among the different stages, thus attempting to move those smokers who are not ready to quit to the next stage of readiness. However, several demographic and practical variables should be considered when attempting such a feat. First, African American women are least likely to quit once they start smoking. Special programs designed to target this recalcitrant subsample need to be devised and implemented, perhaps through working with their gynecologists or other female community leaders. Second, considering the low education level of the present sample, on a practical level such tailored interventions that use written material may prove less than ideal. If participants can not read or understand the material, it obviously has little chance of success. Future research should explore methods of low-
invasive interventions for people in early stages of change that are more likely to be understood and accepted by this sample, such as direct feedback from their physicians or other respected community leaders (e.g., pastors, politicians). The use of television programs, telephone contact, and/or simplified versions of the written materials used in other studies with visual representation of the literary content may also prove useful.

Third, this subsample of the population is poor, which precludes any interventions that require fee for services, ready access to transportation, or material resources (e.g., medications, computers). Fourth, this subsample of the population is predominately unemployed. This means that interventions would probably have to be implemented through community outreach, mail, or telephone rather than through work sites.

Another finding to consider when designing education programs regarding smoking is that increasing awareness of the adverse consequences of smoking only appears important in so far as this motivates a smoker to think about quitting, but it is not likely to affect whether they actually quit or if they maintain abstinence. This is supported by the fact that cons differentiate between Precontemplation and Contemplation but really do not differentiate between any other groups and, in fact, are rated progressively less important after passing the Preparation stage. Therefore, focusing on the cons of smoking after a person has the requisite knowledge and intends to quit may prove futile and of little importance or may even alienate others.
who shy away from "scare" tactics. Rather, other cognitive aspects of smoking should be targeted for change. For instance, since the pros of smoking may still be rated highly even though a smoker states that he has been thinking about quitting, interventions designed to teach smokers methods of fulfilling the needs cigarettes cater to with more adaptive ways may prove useful in actually getting people to quit. If a smoker uses smoking to relax when feeling tense and stressed, then teaching him effective relaxation strategies or cognitive coping self-statements may make smoking cessation easier. Additionally, as mentioned earlier, it may be important to effect behavior change before changes in cognition occur. Actually eliciting preliminary quit gestures, such as designated no-smoking days, decreasing the number of cigarettes smoked, restricted smoking (e.g., no smoking in house), or changing brands to lower nicotine cigarettes may bolster confidence, which may in turn further reinforce quit attempts.

Proper assessment of where smokers are on the readiness continuum by health care professionals who come in contact with smokers is important. This might not only include obtaining a degree of a person's commitment to quitting, but also a quick assessment of how confident they are that they can resist the temptations, how they view smoking (i.e., as good or bad), and whether they believe the advantages of smoking outweigh the disadvantages. Such an assessment may allow for a more appropriate intervention strategy and may result in better referrals to mental health personnel conducting
smoking cessation groups. The research also certainly suggests that "fear" tactics consisting of scaring patients by telling them about the health effects of smoking in order to motivate them to quit smoking may be effective in getting them to consider quitting, but it probably will have little effect on their actual cessation unless other important cognitive changes take place. Nevertheless, advice and prompts from physicians, as well as other significant people in the smokers life, appear important in getting the smoker to quit. Physicians may need to be trained to assess stage and do more than scare patients, e.g., encourage quit attempts, restricted smoking, provide alternatives to the pros associated with smoking.

Limitations

Type I error occurs when a researcher rejects the null hypothesis when it should be accepted, thus making inaccurate conclusions that a relation exists between two or more variables when it actually does not. Conversely, Type II error refers to when a researcher accepts the null hypothesis when it should be rejected, thus making inaccurate conclusions that a relation does not exist between two or more variables when they actually do not. If a person has a very large number of participants and/or computes multiple statistical tests, the chances of making a Type I error increase and the researcher is more likely to "pick up" on statistically significant findings that may not be practically significant. This author attempted to reduce the likelihood of making a Type I error by examining
only variables on a univariate level that were found to be significant through the multivariate test (i.e., the MANCOVA) and by using a conservative post-hoc test (i.e., Tukey's Honestly Significant Difference test) for the ANCOVAs. The number of participants was reasonable and should not cause concern regarding inflated power leading to the detection of statistically significant results that are practically useless. Also, the patterns of the relations between the variables were examined and conclusions were based on trends rather than individual analyses, and every ANCOVA was significant below the .001 level, suggesting there was a very small chance that the null hypothesis would be rejected when it should be accepted. Nevertheless, it is always possible that conclusions are made that are not accurate, which is why replication of these findings is important.

Since two stages of change contained a rather low number of participants, (i.e., Preparation = 29, Action = 23), the likelihood that the author missed a relationship that did not show significant on the statistical tests is possible. However, an examination of the pattern of the results indicates that these 2 stages were successfully differentiated by several variables. Nevertheless, it may be likely that, had more participants been in these 2 stages, other variables that were not significant predictors may have turned out significant.

The standard caveats regarding cross-sectional research applies to this study as well. First, causal interpretations are impossible to make based
solely on cross-sectional research. Such interpretations must be guided by reason, theory, and previous research. Second, since the sample was not tracked over time, conclusions regarding how and when the variables "change" and "move" as people progress through the stages are tentative. The only conclusions to be made are how people differ between stages at any given time. To remedy this, a longitudinal study would need to be conducted using the variables included in this study to determine if they remained good predictors when multiple assessments over time are taken. This might also help to resolve the cognition-behavior controversy by discovering which changes take place first: changes in cognition or changes in behavior. It is of course possible that certain variables follow different patterns, with some variables changing before behavior occurs (i.e., self-efficacy), and others changing only after behavior occurs (i.e., temptations).

The way the variables were measured allows for two important confounds: shared method bias and response bias. The fact that each of the variables was assessed solely by self-report opens the door for the possibility that the relations were artificially inflated simply based on the fact that the constructs were assessed with the same mono-method technique (self-report). Using different methods of assessing the same variables, such as other-report, direct behavioral observation, behavioral challenges, and/or daily monitoring, would have helped to account for this possible confound and would serve to strengthen the confidence of the conclusions. Unfortunately, such procedures
also are often impractical in field research. A response bias refers to the likelihood that the relations were artificially inflated simply because participants differed in their test-taking tendencies rather than the actual constructs the measures were supposed to assess. Preventative measures were taken to make this less likely. Namely, the measures used in the study had alternating valence and format to discourage a response set. The importance of investigating the likelihood of a response bias was made even more salient by the fact that every variable of interest used in the study was found to be a significant predictor of smoking stage of change. To help account for the possibility of a response bias, 2 measures that were similar in format to the questionnaires used in the study but which measured constructs totally unrelated to smoking (i.e., self-efficacy regarding exercise and dietary fat consumption) were used as predictors of smoking stage of stage. Both of the unrelated variables turned out to be insignificant predictors of smoking stage of change, suggesting that the results obtained from this study were not unduly influence by a response bias.

The author attempted to detect and account for other possible confounds like social desirability and experimenter demand. It is possible that participants may respond in a socially favorable way to please the examiner or in order to put themselves in a favorable light. This means that people prone to do this would have been more likely to say they were non-smokers or that they intended to quit smoking when they actually didn’t, thus
skewing the results. However, this was not the pattern that was found when social desirability, as measured by the Marlowe-Crowne (Marlowe-Crowne, 1960), was examined across stage. Moreover, examiners attempted to minimize any potential experimenter demands placed on participants by phrasing questions in a neutral tone and avoided making any extraneous comments that might imply pleasure/displeasure or may inadvertently inform the participant of the study hypotheses.

Finally, the generalizability of this study is limited primarily to low-income, African American, primary care medical patients in Louisiana. It does not necessarily reflect the African American race as a whole nor does it necessarily reflect medical patients in general. However, the fact that the results were comparable to other studies using diverse populations implies that the findings regarding predictors of smoking stage of change are robust, particularly those found using pros, cons, and self-efficacy (the three variables investigated most often).
CONCLUSION

This study found that the integrated model using variables from the decisional balance theory, self-efficacy theory, and the TOPB predicted stage membership among ever smokers. Each of the 6 variables composing the model predicted stage membership when analyzed individually, though the degree to which they predicted stage membership differed considerably. Self-efficacy proved most powerful, while pros, cons, smoking attitudes, temptations, and subjective norm enjoyed varying degrees of success. Clinical implications of these results point to the importance of assessing cognitions towards smoking and targeting these attitudes and beliefs with appropriate interventions in an effort to move smokers through the stages from Precontemplation to Maintenance. Finally, these findings should be replicated using longitudinal studies to help further investigate the causal role the cognitive variables have in determining smoking cessation and to determine whether cognitive changes precede behavior change, or vice versa.
REFERENCES


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VITA

Edwin Boudreaux (a genuine cajun) graduated Summa Cum Laude in Psychology from the University of Southwestern Louisiana in May 1992. He earned his Master of Arts degree in Clinical Psychology from Louisiana State University in December, 1994, under the expert tutelage of Phillip J. Brantley, Ph.D.

Mr. Boudreaux's primary research interest lies in the area of stress and stress management, with particular emphasis on health professionals and emergency service providers. Mr. Boudreaux's personal interests include practicing martial arts, playing volleyball, reading and writing fiction, studying world philosophy and culture, socializing with friends, and brewing and drinking homemade beer. His pet peeves include people who become obnoxious when they drink, people who are obnoxious when they don't drink, and, most importantly, having to put documents in graduate school format. He particularly hates that! At times, he has been known to burst into spontaneous laughter for no apparent reason and dances like a drunk chicken—but dances nonetheless.

His life philosophy can be summarized as follows: there is no place but here, no time but now, so get off your ass and get happy.

Mr. Boudreaux is ecstatic about finally finishing his Ph.D. and is ready to enter the masses of the working poor. Anybody need a psychologist?
DOCTORAL EXAMINATION AND DISSERTATION REPORT

Candidate: Edwin Boudreaux

Major Field: Psychology

Title of Dissertation: An Integrated Model Predicting Smoking Stage of Change Among a Sample of Government-insured and Indigent Medical Patients

Approved:

Major Professor and Chairman

Dean of the Graduate School

EXAMINING COMMITTEE:

Date of Examination: 11-8-96

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