

SMOKING CESSATION WITHIN THE FEDERAL EMPLOYEE POPULATION

by

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DISSERTATION

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## ABSTRACT

### Smoking Cessation Within the Federal Employee Population

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This article-based dissertation consists of two complete manuscripts related to smoking cessation within the federal employee population. In the first manuscript, the self-determination theory was described and evaluated using Walker and Avant's criteria. A demonstration of how the theory has been used in previous research, as well as the application of the theory to federal employees who smoke was also presented in the article. There was no theoretical framework for administrators or clinicians to use when developing, implementing, or evaluating smoking cessation. Manuscript one addresses the need for a theoretical framework. As theory creates the foundations of nursing practice, occupational health nurses and researchers can use their clinical and research skills to explain and confirm theoretical propositions to advance health outcomes of employee populations.

Manuscript two was a data-based retrospective study of federal employees' outcomes following a smoking cessation intervention. Administrators working in Federal Occupational Health (FOH), collected smoking cessation data on employees who participated in the intervention between 2009-2019, without analysis of the data. The study findings represent the first analysis of the data that described the sample population and factors associated with smoking cessation within this population. Comprehensive smoking cessation interventions are effective when employees are aware that they exist. FOH's smoking cessation intervention

helped federal employees quit smoking. Program administrators can do a better job at collaborating with other federal administrators to ensure that federal employees have easy access to evidence-based smoking cessation interventions, FDA-approved cessation medications, and behavioral counseling. The outcomes of the research may help promote future tobacco cessation interventions at the worksite and increase quit rates within this employee population.

The dissertation concludes with additional limitations of study two, implications for nursing practice, and future research. Worksite tobacco cessation interventions may increase federal employees smoking quit rates and ultimately lead to better health outcomes within this population.

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## DEDICATION

I dedicate this dissertation to my mother, Mrs. Addie B. Brown Ross Willis, who has been my number one cheerleader and supporter. I learned from the best, and you are my first and forever educator.

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# **Smoking Cessation Within the Federal Employee Population**

## **CHAPTER 1**

### **INTRODUCTION**

Despite the deleterious health and economic effects of tobacco, smoking remains prevalent in the United States. Among U.S. adults, 34.2 million or 13.7% smoke, and cigarettes are the most used tobacco product (Creamer et al., 2019). With approximately 1,300 people dying every day from risks associated with cigarette smoking, tobacco use continues to threaten the health and wellbeing of the nation [Office on Smoking and Health (OSH), 2014].

The U.S. government has implemented programs to help federal employees decrease smoking, such as campus-wide tobacco-free policies and comprehensive tobacco cessation benefits through insurance carriers in the Federal Employees Health Benefits Program (U.S. Office of Personnel Management [OPM], 2014). Unfortunately, only 10% of federal employees were aware of the benefit, and not all employees received insurance through federal government insurance with access to a smoking cessation benefit. Nevertheless, 60% of tobacco users wanted to quit (OPM, 2014).

To assist with smoking cessation within the federal employee population, occupational health professionals working for Federal Occupational Health's worksite smoking cessation programs could help determine smoking prevalence among federal workers and promote the health and wellbeing of this population. In addition to tobacco-free policies and extending insurance benefits to include smoking cessation, the federal government can leverage a worksite smoking cessation program to encourage employees to quit smoking and further promote cessation rates.

This chapter includes a brief discussion of the significance, background, and problem of smoking among the federal employee population. The rationale for manuscript #1, which is the underpinnings for the theoretical framework, will include relevant assumptions, research questions, and limitations. Furthermore, this chapter will include the rationale for manuscript #2 to include assumptions, research questions, methods, and limitations. The chapter will conclude with definitions of key terms and a summary.

### **Significance of Smoking**

Cigarette smoking is one of the largest international public health threats. The associated risks and harmful effects of smoking on overall health of individuals have been documented nationally and internationally (OSH, 2014; Sorenson et al., 2017). Long term smokers have an increased risk of developing chronic obstructive pulmonary disease, cardiovascular disease, and lung cancer (Taghizadeh et al., 2016). The economic expense of smoking and exposure to tobacco smoke can cost \$300 billion annually (OSH, 2014). Furthermore, it can cost approximately \$5816 annually to employ a smoker (Berman et al., 2014).

### **Background of Smoking in the Federal Employee Population**

The OPM (2014) officials report having challenges determining the smoking rate among U.S. federal employees. Several factors contribute to the difficulty in obtaining accurate smoking rates. The various methods of collecting data, the uncertainty of self-reporting data, and the employees' reluctance to release smoking status make it difficult to collect accurate data among this group (OPM, 2014). Investigators in one study reported federal employee smoking rates of 13% (Asay et al., 2017), similar to the national smoking rate of 13.7% (Creamer et al., 2019).

In the federal workplace, the OPM (2014) recognized that smoking was a problem and implemented the FEHB Program, that extended tobacco cessation allowances to federal employees, retirees, and dependents covered by participating insurance carriers (OPM, 2014). It includes a minimum of four counseling sessions, FDA approved cessation medications, and two quit attempts per year, with no charge to the employee. Tobacco control within the federal employee population continues to be a major focus of the OPM since the implementation of the tobacco cessation benefit in 2011.

To demonstrate commitment to the health and wellness of federal workers, the OPM also guides federal directors and managers in establishing and implementing wellness programs for their employees to include smoking cessation interventions. Under Title 5, U. S. Code, Section 7901, federal agencies can offer health promotion and prevention services (OPM, 2020). These wellness interventions are often based on employee needs and the agency's appropriated funds. Agencies can use appropriated funds and may partner with other entities to support or implement worksite wellness programs, to include smoking cessation interventions (OPM, 2020).

### **The Problem of Study**

Federal Occupational Health Services (FOH, 2020a), a non-appropriated agency within the Program Support Center of the DHHS, has partnered with federal agencies to provide comprehensive occupational health services to include employee wellness, behavioral health, environmental health and safety, and employee wellness services for more than 70 years. Wellness and occupational health nursing professionals offer a comprehensive tobacco cessation program to include an initial assessment, four weeks of free Nicotine Replacement Therapy (NRT) products (patches, gum, or lozenges), 2-week follow-up call to enforce cessation strategies, a choice of four counseling sessions, and a 6-month follow-up survey to assess quit

rates (FOH, 2020b). FOH officials have been collecting participant data from the smoking cessation intervention since 2009 without analysis or evaluation of the data.

In addition to the lack of analysis of outcome data for this intervention, there is no theoretical framework for administrators or clinicians to use when developing, implementing, or evaluating smoking cessation. This lack of a framework led the author to first search for and apply an appropriate theory. Manuscript #1 addresses the need for a theory framework.

Very little is known about the characteristics of federal employees who participated in FOH's smoking cessation intervention, and no studies were found that directly addressed the quit rates of this population. Manuscript #2 addressed this gap in literature, described the federal employee population who participated in FOH's worksite smoking cessation intervention, and examined relationships and factors that may have influenced cessation rates.

### **The Rationale for Manuscript #1**

Since there was no theory consistently used by occupational health nurses in smoking cessation programs, there was a need to identify and apply such a theory. The search for a theory led to the self-determination theory (SDT). Manuscript #1 includes a description of SDT, an analysis using Walker and Avant's (2011) criteria, a demonstration of how the theory has been used in previous research, as well as the application of the theory to federal employees who smoke. The authors concluded with a discussion of the importance of using theories to guide clinical and research practice within an occupational health setting.

Deci and Ryan (1985) focused on how social environments and psychological orientations facilitated or impeded human behaviors. They posited that regardless of developmental level and culture, all human beings have a basic psychological need for autonomy, competence, and relatedness (Deci & Ryan, 2000). When these basic needs are met

and when people have supportive environments, they are more likely to make healthy behavior changes.

Educating occupational health nurses of a motivational based theory that could be used to frame clinical practice with regards to implementing health and wellness initiatives is one reason for the publication. Although the SDT is defined as a macro-theory, the authors found the theory to be logical, useful, generalizable, and easy to describe within the context of an on-site smoking cessation intervention. Additionally, the visual model depicted in the publication describes the associative relationships between concepts within the theory. Two relational statements between concepts within the SDT that are most applicable for a smoking cessation study targeting federal employees are:

- An autonomous working environment will most likely result in employees engaging in autonomous health decisions that can result in positive behavior changes.
- Autonomy, competence, and relatedness are positively correlated with healthy behavior changes.

### **Application of the SDT in Occupational Health**

Occupational health nurses and researchers are in unique positions to explore ways to motivate healthy behaviors. Specifically, nurses who implement a smoking cessation intervention to federal employees are exceptionally qualified to facilitate positive health behavior changes in that population. Occupational health nurses can offer flexibility through on-site access to smoking cessation services, reinforcement of the health benefits of quitting, and resources and suggestions for quitting without employees leaving their worksite locations. Employers, who are often faced with limited financial resources, can use evidenced-based research when deciding which policies or programs to implement. Supporting comprehensive



smoking cessation interventions within the workplace is related to an employees' autonomous decision to stop smoking.

### **Assumptions for Manuscript #1**

1. Smoking cessation outcomes are greater when employees engage in work-site tobacco cessation interventions.
2. When individuals are supported, they are more likely to engage in healthy behaviors.
3. Participating in a comprehensive tobacco cessation intervention increases the chances of quit.

### **Research Questions for Manuscript #1**

1. What concepts within the SDT can clinical occupational health nurses apply to federal employees who smoke?
2. What future research questions are suggested by the SDT in occupational health and smoking cessation?

### **Limitations of Manuscript #1**

1. This is only a description of a theory with suggestions for both clinical practice by occupational health nurses and for future studies by nurse researchers.
2. The theoretical relationships suggested by the theory have not yet been measured in occupational health settings with smoking cessation.

### **The Rationale for Manuscript #2**

There is a need to use data to support decision making and future research questions related to U.S. federal employees and on-site smoking cessation interventions. FOH officials have been collecting self-reported data since January 2009 on federal employees who voluntarily

participated in a comprehensive smoking cessation program but have not analyzed the data. They are in a unique position to share information about program effectiveness with other federal administrators to ensure smokers have access to evidence-based tobacco cessation interventions. No specific research exists describing the federal employee population who participated FOH's worksite smoking cessation intervention to include their rates of smoking cessation. Therefore, there is a need for a research publication.

To have the healthiest workforce possible, federal officials can use this information to better plan tobacco control interventions and policies. Through better smoking cessation interventions and policies, employees can make autonomous health decisions that can lead to better health outcomes. Manuscript #2 included the study findings, conclusions, implications for clinical practice, and implications for future research.

### **Assumptions for Manuscript #2**

1. Federal employees who participated in the smoking cessation intervention gave accurate and honest answers to the post-intervention survey.
2. Participants answered the survey whether or not they had successful quit attempts.
3. The survey database has been accurately stored by the program administrators.

### **Research Questions for Manuscript #2**

1. What is the age and smoking history of this population?
2. How many employees used Nicotine Replacement Therapy (NRT), quit smoking, reduced usage, or dropped the program?
3. How did employees rate the overall counseling sessions and the overall program intervention?

4. What percentage of employees stated that being able to access the smoking cessation program at work, free medication, and having an agency tobacco free program at work was an incentive to try to quit smoking?
5. Is there a correlation between the number of cigarettes smoked and the length of smoking?
6. Is there a correlation between employees who received NRT in a timely manner and employees who quit?
7. Is there a correlation between prior quit attempts and quitting?
8. Are the length of smoking, number of cigarettes, or ability to access FOH's cessation intervention predictors of quit?

#### **Definition of Key Terms**

1. Tobacco Cessation Intervention: Federal Occupational Health's smoking cessation intervention consisting of 4-week of NRT (patch, gum, or lozenges), counseling, 2-week follow-up call, and 6-month follow-up survey to assess program intervention.
2. Quit: Operationally defined as participants who responded 'yes' to the question, "did you quit smoking?"
3. Federal employee population: Employees who participated in a 6-month follow-up survey of FOH smoking intervention from January 2009- January 2019.
4. Federal Occupational Health Services: A non-appropriated agency within the Program Support Center (PSC) of the U.S. Department of Health and Human Services (HHS).

#### **Summary**

Although smoking is a public health threat both nationally and internationally, the federal government has implemented policies to assist employees in decreasing or eliminating smoking. For example, OPM created the FEHB, which extends smoking cessation benefits to federal employees, their dependents, and retirees. In addition, some federal employees who smoke and have a desire to quit, have access to an agency-sponsored smoking cessation intervention through the Federal Occupational Health Services. Both services are provided at no cost to the employee.

Because FEHB includes many different insurance plans, employee's reluctance to report smoking status to their employer, and the uncertainty of self-reporting data, it is difficult to determine federal employees' smoking cessation rates. Moreover, federal officials may fail to use data analysis to describe programmatic effectiveness to make future decisions related to smoking interventions and policy formation. For example, Federal Occupational Health Services officials have been collecting data on participants who participated in a smoking cessation intervention since 2009 without analysis. Little is known about this population and smoking cessation rate. Describing the demographic characteristics of this population and publishing the results of a worksite smoking cessation intervention can offer federal officials with evidence of programmatic effectiveness that can ultimately lead to better health outcomes for this population.

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# Smoking Cessation Within the Federal Employee Population

## CHAPTER 2

### SELF-DETERMINATION THEORY WITH APPLICATION TO EMPLOYEE HEALTH SETTINGS<sup>1</sup>

Ross, B. M., & Barnes, D. M. (2018). Self-determination theory with application to employee health setting. *Workplace Health and Safety*, 66, 367-372.

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## Self-Determination Theory With Application to Employee Health Settings

Brenda M. Ross, MSN, RN, COHN-S<sup>1</sup> and Donelle M. Barnes, PhD, RN, CNE<sup>1</sup>

**Abstract:** Occupational health nurses motivate employees to engage in healthy behaviors. Both clinicians and researchers need strong theories on which to base decisions for health programs (e.g., healthy diet) and experimental interventions (e.g., workplace walking). The self-determination theory could be useful as it includes concepts of individual autonomy, competence to perform healthy behaviors, and relationships as predictors of health behaviors and outcomes. In this article, the self-determination theory is described and evaluated using Walker and Avant's criteria. The theory is applied to a population of federal employees who smoke. By increasing employees' ability to autonomously choose smoking cessation programs, support their competence to stop smoking, and improve their relationships with both others who smoke and employee health services, smoking cessation should increase.

**Keywords:** self-determination theory, health promotion, organizational culture/climate, smoking cessation, disease prevention

Occupational health nurses are challenged to assist employees in maintaining and improving their health. Although nurses can present information and provide specific health programs (e.g., dietary or physical activity programming), it is employees who must engage in the activity and change their health habits which can involve nurses teaching and motivating employees. To better transmit information and motivate behavior change, clinicians and researchers need theoretical frameworks on which to build employee programs or research interventions.

Self-determination theory (SDT) has been applied to various fields of study, including health care and health promotion. This theory focuses on autonomy, competence, and relationships as predictors of performance and health outcomes (Deci & Ryan, 2008). Occupational health nurse clinicians and researchers can

use SDT to examine motivating factors that predict behavior change and positive health outcomes in employee health settings. This article includes a description of SDT and an evaluation of its logical adequacy, usefulness, generalizability, and parsimony. The authors briefly describe previous research studies based on this theory and provide practical application of the theory for researchers and clinicians working with federal employees who smoke.

### Self-Determination Theory Description

The SDT had its origins in psychology; Deci and Ryan (1985) studied students' behavior in regard to rewards and motivation. In early studies, they investigated how social conditions and human orientations facilitated or undermined human behavior. They defined SDT as a macrotheory that "addresses basic issues as personality development, self-regulation, universal psychological needs, life goals and aspirations, energy and vitality, nonconscious processes, the relations of culture to motivation, affect, behavior, and well-being" (Deci & Ryan, 2008, p. 182). The theory authors hypothesized that all human beings, regardless of culture or developmental level, had basic psychological needs for autonomy, competence, and relatedness, which can be supported or not supported by social environments (Deci & Ryan, 2000; see Figure 1). When these basic needs are met, individuals are more motivated to change or maintain behaviors. Change is distinguished by the type of motivation (autonomous vs. controlled), not necessarily by how much an individual is motivated to reach a goal or health outcome (Deci & Ryan, 2008).

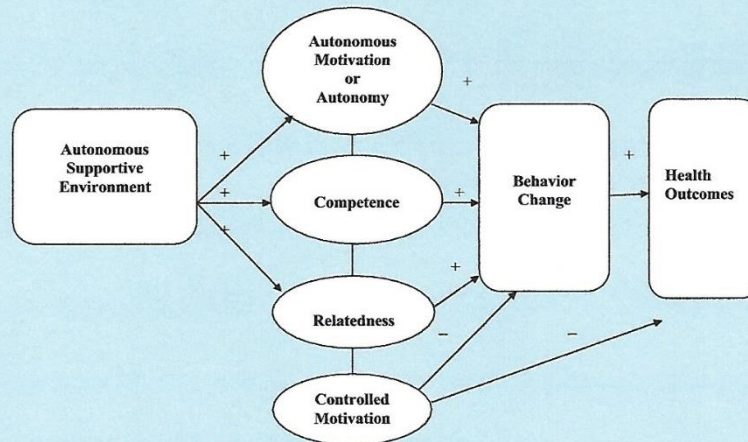
### Main Concepts

#### *Autonomous supportive environment*

In autonomous supportive environments, individuals are free to provide feedback on decision-making processes as opposed to a controlled environment in which no freedom exists (Williams, Gagné, Ryan, & Deci, 2002). Health care professionals

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**Figure 1. Self-determination theory (created from Deci & Ryan, 2000).**

*Note.* In this theory, a work environment that supports employees in making autonomous health decisions will result in positive health behavior change and better health outcomes. Employees who are allowed to and supported in making autonomous health decisions, are competent to act in healthy ways, and can relate to other employees and personnel are more likely to make healthy behavior changes. However, a highly controlled work environment is unlikely to support positive behavior change in employees.

can provide a supportive environment in which individuals can make autonomous decisions and fully participate. For example, when a health professional is nonjudgmental and provides choices, clients are more likely to maintain healthy diets.

#### *Autonomy*

Autonomy is defined as self-regulation of life encounters or actions (Ryan & Deci, 2017). When individuals are free to choose specific health behaviors, they are more motivated to maintain behavior change.

#### *Competence*

Competence is demonstrated when individuals believe that they can achieve behavior change or health outcomes (Williams et al., 2006b). When individuals feel competent to reach a goal, they are more likely to maintain the behavior. The concept of competence is similar to self-efficacy in Bandura's (1997) social cognitive theory. The concepts of perceived competence and self-efficacy are not used interchangeably within SDT, but perceived competence and self-efficacy are similar. An example of competence is individuals with hypertension taking their own blood pressure readings at home as part of a hypertension management plan.

#### *Relatedness*

Relatedness is defined as a genuine concern and trust in significant others (Williams et al., 2011) and is essential for psychological growth and well-being (Ryan & Deci, 2000). When individuals receive support from others while adopting new health-related behaviors, camaraderie increases motivation

to maintain behavior change. For example, individuals engaging in a walking program are more likely to persist if they are walking with friends or coworkers.

#### *Controlled motivation*

Motivation is energy that produces an intentional action (Ryan & Deci, 2000). Autonomous motivation is energy for engaging in an action for its inherent satisfaction (i.e., it brings joy) rather than due to external pressures or rewards. In contrast, controlled motivation is energy for participating in an action due to coercion and has no lasting effects on behavioral outcomes. An example of controlled motivation is individuals participating in a weight loss program for incentives. When incentives end, employees are less engaged in the behavior and lose positive health outcomes.

#### *Behavior change*

Behavior change results from actively participating in activities or habits that improve psychological or physical health, including avoiding unhealthy behaviors. In health promotion, desired behaviors often include healthy dietary and exercise habits or smoking and alcohol cessation.

#### *Outcomes*

Health outcomes include physical and physiological indicators such as depression, anxiety, and quality of life (Ryan, Patrick, Deci, & Williams, 2008). Outcomes are the result of behavior change. For example, employees who perceive significant work-related stress can engage in stress reduction through an SDT-based intervention.

Table 1. Measurement Instruments for the Self-Determination Theory

Theory concepts	Measurements instruments
Autonomy and/or autonomous motivation (intrinsic)	<ul style="list-style-type: none"> <li>The Treatment Self-Regulation Questionnaire (TSRQ-S) assesses reason for behavior change. 13 items; 7-point scale (1 = <i>strongly disagree</i> to 7 = <i>strongly agree</i>) (Williams, Niemiec, Patrick, Ryan, &amp; Deci, 2009).</li> </ul>
Perceived competency	<ul style="list-style-type: none"> <li>Perceived Competence Scale (PCS-S) assesses feelings about the ability to stop smoking. 4 items; 7-point scale (1 = <i>strongly disagree</i> to 7 = <i>strongly agree</i>) (Williams et al., 2009).</li> </ul>
Relatedness	<ul style="list-style-type: none"> <li>Important Others Questionnaire assesses the need for support from important others. 7-point scale (1 = <i>strongly disagree</i> to 7 = <i>strongly agree</i>) (Williams et al., 2011).</li> </ul>

### Relationships Between Concepts

Below are explicit relational statements between the concepts included in SDT (Deci & Ryan, 2000; Ryan & Deci, 2000; Ryan et al., 2008; Williams et al., 2002).

- An autonomous supportive environment is positively associated with autonomous motivation, competence, and relatedness.
- Autonomous motivation, competence, and relatedness are positively associated with positive behavior change.
- Controlled motivation is negatively associated with positive behavior change and positive health outcomes.
- Behavior change is positively associated with health outcomes.

### Evaluation of Self-Determination Theory

A theory is composed of "relational statements that present a systematic view about a phenomenon and that are useful for description, explanation, prediction, and prescription or control" (Walker & Avant, 2011, p. 7). Through theory analysis, nurses can determine the theory's strengths and weaknesses to support and guide their clinical or research practices. Using Walker and Avant's (2011) strategies, the authors evaluated SDT for its logical adequacy, usefulness, generalizability, parsimony, and testability. Discussions continued between the authors until both were satisfied with their definitions, relationships among concepts, and application to a group of employees. A literature search of the theory produced several research examples that demonstrated its usefulness and testability. No study was found that used this theory for worksite smoking cessation.

### Logical Adequacy

Logical adequacy requires examining the statements and concepts within the theory for structural and faulty reasoning (Walker & Avant, 2011). Self-determination theory has a logical structure. It flows from left to right, with arrows and +/- to

indicate relationships. Logical predictions can be made from the theory (e.g., sufficient autonomy and competence can predict positive health behavior change; see Figure 1). A realistic model describing the association between concepts offers a visual representation of the structure and logical flow of the theory.

### Usefulness

A theory is useful when nurses can practically apply the theory to predict or understand outcomes (Walker & Avant, 2011). This theory is useful because worker autonomy, competence to perform tasks, and relationships are concepts well known in nursing and easily applicable to multiple health behaviors. Self-determination theory can be used to study health promotion behaviors, self-care for chronic disease, or posthospital rehabilitation. Using SDT as a theoretical framework is a novel approach for worker smoking cessation.

### Generalizability

Generalizability is demonstrated by applying the theory widely in various fields of studies or populations (Walker & Avant, 2011). Self-determination theory can be used to explain or predict human motivation and behavior across all cultures and populations. The framework can be broad (studied in many different fields) and behavior specific (e.g., medication adherence or smoking cessation).

### Parsimony

Walker and Avant (2011) define a parsimonious theory as one that is succinct and easy to describe or outline. Self-determination theory is parsimonious with seven concepts that can be clearly defined and linked. It would be difficult to predict human motivation with fewer concepts. To provide a simple expression of the theory, the authors created a model to clarify the concepts and relational statements within the theory (see Figure 1). The visual representation aided in explaining the relationships between concepts and increasing the parsimony of the theory.

### Testability

Testability is the ability of clinicians and researchers to use the theory to measure variables and generate hypotheses (Walker & Avant, 2011). A literature review identified conceptual and theoretical definitions for better understanding theory application. Self-determination theory can generate hypotheses that can be tested. The most commonly used instruments are listed (see Table 1). For example, the Treatment Self-Regulation Questionnaire (TSRQ-S; Williams, Niemiec, Patrick, Ryan, & Deci, 2009) has been used to measure long-term smoking abstinence in a large randomized clinical trial. The scale is reliable with acceptable internal consistency for autonomy related to smoking cessation (Cronbach alphas .85 at baseline and .89 at 6 months; Williams et al., 2009). The Perceived Competence Scale (PCS-S; Williams et al., 2009) also demonstrated internal consistency (Cronbach alphas .90 at baseline and .94 at 6 months).

### Self-Determination Theory in Research

Williams et al. (2006b) applied SDT to smoking cessation and cholesterol-lowering interventions (Williams et al., 2006a). They enrolled 1,006 smokers from a community-based population of low income and less educated adults. Sample mean age was 45.5 years, and 64% were women. Participants were randomly assigned to treatment ( $n = 714$ ) and comparison ( $n = 292$ ) groups (Williams et al., 2006b). The comparison group received a booklet about smoking cessation, the results of cholesterol tests, and a list of smoking cessation programs in their geographic area. The treatment group received the same information but then met with study counselors 4 times over a 6-month period. Counselors supported participants in making clear, autonomous decisions about when and how to quit smoking.

At the end of the 6-month intervention, the treatment group was more likely to use medication ( $p < .001$ ), had more days on medication ( $p < .001$ ), had a higher point prevalence for smoking cessation ( $p < .001$ ), and had a higher prolonged abstinence from smoking ( $p < .001$ ; Williams et al., 2006b). Low density lipoprotein (LDL) cholesterol levels were also significantly reduced ( $p = .05$ ; Williams et al., 2006a). In addition, the authors conducted structural equation modeling using study data to assess goodness of fit. They found that autonomous motivation predicted medication taking (.20,  $p < .01$ ) and that perceived competence predicted smoking cessation (.24,  $p < .01$ ). This theory-based study showed that the concepts in the theory can be measured and that the concepts significantly affect health outcomes in two health areas, smoking and cholesterol.

Pesis-Katz, Williams, Niemiec, and Fiscella (2011) examined the same smoking intervention based on SDT used by Williams et al. (2006b), focusing on the cost-effectiveness of the intervention ( $n = 737$ ). They found a cost-effectiveness ratio of US\$1,258 per quality-adjusted-life-year saved. They concluded that, among insured smokers, the SDT intervention was cost-effective compared with other smoking interventions.

Niven and Markland (2016) used the SDT theory to assess employees participating in a walking challenge in Scotland. Their sample size was 298, mean age 42 years, and 81% of the sample were women. They tested measurement tools for SDT constructs related to walking: the Behavioral Regulations in Walking Questionnaire, Psychological Needs Satisfaction for Walking Scale, and the International Physical Activity Questionnaire-long form (frequency and duration of physical activity in the domains of job-related, domestic, and leisure activity). The researchers found that the theory performed as expected but not for all forms of walking. Walking for leisure versus during work tested differently; walking at work demonstrated no significant relationships between the variables which suggested that workers require different motivation for this specific behavior. The authors concluded that SDT supports changes in walking, but instrument development is needed (Niven & Markland, 2016).

In summary, SDT has been used in several intervention studies with smoking cessation, cholesterol management, and walking behaviors. All studies included adult samples, with more women than men. Positive health outcomes were documented, and structural equation modeling was successful. All findings indicated continued use of SDT to understand motivating positive behavior change.

### Application of Self-Determination Theory to Federal Employees Who Smoke

Self-determination theory can be applied to federal employee smoking cessation; both the theory and the problem have a human motivation component. Clinicians have smoking cessation tools in their arsenal, but motivating workers to use these tools remains a challenge. The U.S. Office of Personnel Management (U.S. OPM; U.S. OPM, Planning and Policy Analysis, 2014) surveyed the Federal Employee Health Benefits (FEHB) population about their tobacco use, accessing a random sample of 40,000 nonseasonal executive branch employees. Sixty-five percent of these employees reported having used tobacco products within the last 30 days. The U.S. OPM must continue to encourage these employees to reduce or eliminate tobacco products.

### Autonomous Supportive Environment

Currently, the available on-site smoking cessation programs consist of two counseling sessions a year and nicotine replacement patches, a 4-week to 6-week supply of transdermal patches, nicotine lozenges, or nicotine chewing gum. According to SDT, if employees do not feel supported, they will not change their smoking behavior. Federal employers and supervisors need a supportive environment for employees who are ready to quit smoking. These employees also need choices regarding smoking cessation programming (e.g., choosing among cessation programs, when cessation will begin, and how programs will be accessed).

### Competence

Smoking cessation competence refers to employees' abilities to use nicotine patches, nicotine gum, or counseling to decrease tobacco use. When employees feel competent in their ability to use a product or participate in a program, they are more likely to maintain new behaviors. Clinicians must teach employees how to use products and provide advice and encouragement to employees. To further support competence, clinicians can provide relevant feedback, be positive about the process, and encourage employees to develop problem-solving skills (Williams et al., 2011). Perceived competence is positively associated with psychological and physical wellness (Deci & Ryan, 2000). Employees must learn to set small attainable goals and evaluate progress during health unit visits or counseling sessions.

### Relatedness

Active smokers who develop relationships with other smokers who have similar desires to quit are more likely to engage in smoking cessation programs. These relationships can occur at the workplace during the workday. The addition of at-home supportive relationships is also essential, as family members and friends can sabotage cessation efforts if they are smokers themselves. When supporting relatedness, providers can develop interpersonal yet professional relationships with employees while remaining nonjudgmental. Developing trust and providing a warm and inviting relationship improve employee interactions.

### Controlled Motivation

Employees are more likely to change smoking behaviors if the environment is not controlled by supervisors or health care personnel. The motivation to act must be internal. Employers can offer rewards for progress toward smoking cessation, but threatening punishment will not result in positive outcomes.

### Behavior Change

Desired behavior changes include decreasing the number of cigarettes smoked daily, using nicotine patches or gum, calling a counselor, or eliminating smoking. The ultimate desired outcome is long-term smoking cessation. The more autonomy, competence, and relatedness employees feel within a supportive work environment, the more likely they are to persist in achieving cessation.

### Policy Change

In 2003, federal employee health plans provided some coverage, but none provided comprehensive smoking cessation interventions (U.S. OPM, Planning and Policy Analysis, 2014). Some federal agencies offer on-site smoking cessation programs or interventions, but not all. Under the on-site employee sponsored smoking cessation program, prescription-based products such as Chantix (varenicline tartrate) and Zyban

(bupropion hydrochloride) are not offered. The U.S. OPM should consider adding employee health benefits at all federal agencies and workplaces, including prescription medications. The more options offered to employees, the more likely these employees are to eliminate tobacco.

### Future Research Questions

Self-determination theory suggests possible research questions for a federal employee population. Researchers could describe federal employees' perceptions of management support for smoking cessation, their perceived autonomy to act, their sense of competence to engage in nonsmoking habits, and their degree of relatedness to others who smoke. The concepts within the theory could become items on an assessment or measurement tool to discover how ready an employee is to quit smoking. Interventions such as on-site smoking cessation programs and prescription-based products should be tested for their impact on cessation rates, motivation to seek professional assistance in quitting smoking, or employee engagement in smoking cessation programs within the federal employee population.

### Conclusion

As theory creates the foundations of nursing practice, occupational health nurses can use their clinical and research skills to explain and confirm theoretical propositions to advance health outcomes and well-being of employee populations. Knowledge of the SDT, a motivation-based theory, can predict behavior change and promote health outcomes such as smoking cessation. As comprehensive smoking interventions are needed in employee health settings, it is occupational health nurses who can provide autonomous supportive environments and positive interactions with employees who smoke.

### Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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### Author Biographies

*Brenda M. Ross is a regional nurse manager at the Federal Occupational Health agency. She is currently a PhD nursing student at the University of Texas at Arlington, studying smoking cessation in federal employees.*

*Donelle M. Barnes is an associate professor of nursing at the University of Texas at Arlington. She teaches nursing philosophy and theory to doctoral students every year.*

## Smoking Cessation Within the Federal Employee Population

### CHAPTER 3

#### A RETROSPECTIVE STUDY OF FEDERAL EMPLOYEES' OUTCOMES FOLLOWING A SMOKING CESSATION INTERVENTION<sup>2</sup>

Swilley, B. R., Barnes, D. M., & Wang, J. (in press). A retrospective study of federal employees' outcomes following a smoking cessation intervention. *Journal of the National Black Nurses Association*

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## **Smoking Cessation Within the Federal Employee Population**

### **CHAPTER 4**

#### **CONCLUSIONS**

##### **Limitations of Study Two (Manuscript Two)**

Since Manuscript Two was a retrospective study, the authors cannot verify data accuracy. Only by conducting future prospective studies can we better control data collection. There were questions in the post-intervention survey that were not clear, and therefore the answers could not be analyzed. The survey items need to be clearer so that the data is cleaner.

As a data-based retrospective descriptive study, the pre-existing database did not include vital demographic variables such as gender, race, or socioeconomic status. It is important for future studies to describe this population in terms of these variables and explore differences among groups, if they exist. It would be interesting, for example, to explore if participants in this study had similar sociodemographic characteristics as the private sector workforce. Because this study did not describe this population in terms of their gender, education, income level, employment status, or marital status, analysis were limited.

Additionally, the database used a self-report survey tool and did not assess the participants' nicotine dependency or any other physiologic measure. Higher nicotine dependence has been associated with lower abstinence rates, so that might be an important variable to measure (Zhou et al., 2009). A modified survey using Heaviness of Smoking Index (HSI) can be used in large, population-based studies (Lim et al., 2012). This measurement conceptualizes addiction in terms of behaviors ('time of first cigarette upon waking' and 'quantity of cigarettes smoked in a day') and it is easy to administer. Adding this two- item scale

to an agency's modified survey, would help examine nicotine dependence within this population relative to smoking cessation.

## **Implications for Nursing Practice**

### ***Study One (Manuscript One)***

The self-determination theory could assist clinicians as they plan, implement, and evaluate smoking cessation efforts (Ross & Barnes, 2018). In the occupational health care setting, on-site care providers can provide a supportive autonomous environment to employees wanting to quit smoking by offering various types of nicotine replacement therapies and smoking cessation services. Easy access to tobacco cessation services can increase participation in the intervention, decrease employee smoking or tobacco use, which can subsequently lead to long-term smoking cessation.

### ***Study Two (Manuscript Two)***

Although adult cigarette smoking has declined to 13.7% in 2018 from 14% in 2017, 34.2 million U.S. adults continue to smoke (Creamer et al., 2019). There must be a continuous concerted effort at all levels to reduce tobacco-related illness and death in the United States. Both smoke-free workspaces and smoking cessation programs should be continued and expanded when possible. Because occupational and environmental health nurses are in unique positions to assess tobacco use at the employees' worksite, tobacco cessation activities should be implemented in this setting. Federal Occupational Health (FOH) and other governmental agencies that are supporting efforts to decrease smoking within the federal employee population by implementing smoke-free workplace policies, employer-sponsored cessation programs, and offering free NRT are doing their part in creating a healthier workforce and reducing the risks of smoking-attributable healthcare cost and lost productivity.



## **Implications for Future Research**

### ***Study One (Manuscript One): A Theoretical Framework***

Testing the self-determination theory (SDT), to determine motivating factors surrounding quit should not be overlooked. For example, autonomy and or autonomous motivation concepts could be measured using the Treatment Self-Regulation Questionnaire (TSRQ-S; Lim & Ha, 2019) to evaluate motives for smoking behavior change in this population. The results of that study may suggest that providing employees with free NRT and making cessation interventions easily accessible will most likely result in a positive behavior change (smoking cessation). Conceptually, providing an autonomous working environment may have been associated with smoking cessation within this population. Supporting an employee by offering free nicotine patches, gum, or lozenges, and making cessations interventions accessible at the worksite, increases chances of participation and quit.

In addition, perceived competency concept could be measured using the Perceived Competency Scale (PCS-S; Lim & Ha, 2019) to assess the participants' feelings about their ability to stop smoking. Behavior change is more likely to continue when individuals feel competent that they can reach a health-related goal (Ross & Barnes, 2018). By further testing the STD theory, clinicians would have a better idea of how it works and what concepts are more significant in practice.

### ***Study Two (Manuscript Two)***

Clearer definitions are warranted throughout future studies, and some survey questions need revising. For example, the survey writers never defined "quit". Adding questions that require varied responses with continuous variables will possibly garner beneficial information about the participants' cessation status, which is the ultimate goal in smoking cessation research.

For example, adding questions with regards to the number of quit attempts or relapse (providing clear definition of quit verses temporary stop), may provide information on predictors for smoking cessation.

More exploratory work is needed on the association between the number of cigarettes smoked and years smoked before quitting. In this study, the more cigarettes a participant smoked, the participants smoked longer in terms of years before they quit smoking. As stated previously this is counter intuitive to addiction behavior studies which suggests that the longer one smokes the less likely they are to stop smoking. There is a need to examine this phenomenon within the federal employee population. Occupational health nurses and researchers can seek to determine qualitatively what motivates high nicotine dependent smokers (HSI score of 4 or more) to stop smoking long-term (12 months post-intervention). In addition, researchers can qualitatively explore the reasons for quitting or wanting to quit after long-term use.

In conclusion, the U.S. government has implemented programs and provided access to tobacco cessation benefits through the Federal Employees Health Benefits Program (FEBP). Federal employees who want to quit smoking may have easy access to a smoking cessation intervention through their private care providers or Federal Occupational Health (FOH). Providing health promotion and prevention services at the worksite are essential to employees if they are aware that they exist. However, most remain unaware of the interventions available to them. As presented previous and reported from this study, only 10% of federal employees were aware of the benefit offered through the FEBP, and 65% (824) of the participants did not know if their agency had a tobacco-free campus. Government agency administrators can do a better job communicating tobacco cessation services to employees at the workplace. Leveraging the health

care providers that are in close proximity to the federal workforce can further promote smoking cessation interventions and increase cessation rates within this population. Describing the programmatic outcomes of a worksite smoking cessation intervention by examining factors that influenced smoking cessation within this population and publishing the results can lead to decrease cessation rates and ultimately better health outcomes within this population.

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## Appendix A

Letter of Approval to Analyze FOH's Smoking Cessation Database



DEPARTMENT OF HEALTH & HUMAN SERVICES

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Program Support Center  
Federal Occupational Health Service  
1301 Young Street #772  
Dallas, TX. 75202

November 7, 2019

To: University of Texas at Arlington (UTA)-Institutional Review Board (IRB) and  
Dr. Dr. Donelle Barnes, Associate Professor and Student Advisor

Dear members of the UTA-IRB and Dr. Donelle Barnes

This letter serves as documentation allowing Brenda Ross Swilley, MSN, RN permission to analyze data related to Program Support Center's smoking cessation program. Mrs. Swilley has permission to analyze and report findings of data provided from the period of January 2009 to January 2019.

Sincerely,

CDR Tomas Bonome  
Director  
Federal Occupational Health  
Program Support Center  
U.S. Department of Health and Human Services  
7700 Wisconsin Ave.  
Bethesda, MD 20814

Mobile: (202) 868-9509

## Appendix B

Manuscript Acceptance Letter -The Journal of the Black Nurses Association

From: cbrannon@intelliwave.com  
Subject: Manuscript for NBNA  
Date: Oct 23, 2020 at 2:49:33 PM  
To: Swilley, Brenda Ross [brenda.ross@mavs.uta.edu](mailto:brenda.ross@mavs.uta.edu)

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Hello Ms Swilley,

I am pleased to inform you that your manuscript, "A Retrospective Study of Federal Employees' Outcomes Following a Smoking Cessation Intervention," has been accepted for publication.

It will appear in the 2020 Winter Issue (Volume 31, Issue 2) of the Journal of the National Black Nurses Association. After publication, it will be indexed on PubMed.

Thank you for your submission.

Warm regards,

Chris Brannon  
copy editor for the Journal of the National Black Nurses Association