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The Examination of Time Orientation of Smokers
in a Smoking Cessation Intervention

By

Preety Kalra

A dissertation submitted in partial satisfaction of the
requirements for the degree of
Doctor of Philosophy
in
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Graduate Division
of the
University of California, Berkeley

Committee in charge:

Professor William Satariano, Chair
Professor Alan Hubbard
Professor Lonnie Snowden

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Abstract

The Examination of Time Orientation of Smokers in a Smoking Cessation Intervention

By

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**Doctor of Philosophy in Epidemiology
University of California, Berkeley**

Professor William Satariano, Chair

Time perspective may be an important predictor of success in smoking cessation programs. Thus, it is important to better understand the role of time perspective for smoking cessation. More specifically, there needs to a greater understanding of the role that time perspective plays in initiating a quit attempt and in the success of that quit attempt. We hope the information generated from this study will allow us to better understand the role of time perspective and behavior change and to make recommendations for improving smoking cessation treatment programs. Such a project would be valuable because it would allow for identification of specific attributes of the individuals who are more likely to succeed in a smoking cessation intervention and for tailoring of referrals to different forms of smoking cessation treatment to make them better matched to individual recipients. This individualized approach would conserve resources by allocating patients more appropriately to treatment. Gaining a clearer perspective on the relationship between time orientation and smoking cessation outcome will help us understand if treatment programs are appropriately designed for those who enter such programs.

Although there is some information relating time perspective to substance use there is only limited information on the role of time perspective in individuals' making a smoking cessation attempt and whether it fluctuates for those trying to quit. Time perspective may be an important predictor of treatment response in smoking cessation programs. More specifically, there needs to a greater understanding of the role that time perspective plays in initiating a quit attempt and in the success of that quit attempt. Gaining a clearer perspective on the relationship between time orientation and smoking cessation outcome will allow us to guide patients with different time perspectives to appropriate smoking cessation treatment programs.

The proposed study investigated time orientation as a predictor of individuals' successfully completing a smoking cessation treatment program. The aims of this study are to identify the time orientation of patients at entry into a smoking cessation program

and to explore the relationship of time orientation to other potential predictors of smoking cessation.

We will assess the validity of the Zimbardo Time Perspective Inventory in an ongoing intervention trial. We will obtain psychometric data on the Zimbardo Time Perspective Inventory in an adult population at the initiation of an intervention. We will use exploratory factor analysis to determine the most appropriate number of dimensions.

Then we will identify the time orientation of patients at entry into a smoking cessation program and to explore the relationship of time orientation to other potential predictors of smoking cessation. We will conduct a cross-sectional analysis and then examine how time orientation varies across socioeconomic factors of the population. We will also examine whether a single item of the Zimbardo Time Perspective Inventory proves to be more predictive than a domain of the scale. Having a single item that could be used to screen participants in health care settings would alleviate the time necessary to classify an individual by time orientation and allow for tailoring of health interventions to match individual to treatment.

Lastly, we will examine the change for each individual item of the Zimbardo Time Perspective Inventory and the number of cigarettes smoked from baseline to six months post-intervention. We will also assess change for each of the five domains, present fatalistic, present hedonistic, future, past negative and past positive and number of cigarettes smoked from baseline to follow-up.

Characterizing the time orientation of smokers and its relation with smoking cessation is the first step toward designing future tailored smoking cessation interventions that would better meet the cessation needs of smokers. Because of the substantial health, quality of life and economic benefits of smoking cessation, even later in life, determining if time perspective is a predictor of success could have a potentially large impact on public health. Such a study would be valuable because it would allow for identification of specific attributes of the individuals who are more likely to succeed in a smoking cessation intervention and would allow for tailoring of referrals and for appropriate modification of smoking cessation programs to make them better matched to individual recipients.

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INTRODUCTION

Smoking continues to be an important public health concern. There are currently 46.5 million adults who are smokers in the United States¹. Smoking is a risk factor for lung cancer, heart disease, and chronic respiratory disease. One out of five deaths in the United States is related to a smoking-caused condition². In fact, one out of three tobacco users in the United States will prematurely die with an estimated loss of life of eight years³. Smoking causes approximately 435,000 premature deaths per year despite being one of the most preventable causes of death in the United States⁴.

Smoking has considerable consequences for mortality, morbidity, and health care-related costs. However, smoking's negative impact extends beyond the number of deaths to also affect the quality of life of thousands of individuals and health care expenditures. In 1998, smoking-related medical expenditures covering ambulatory care, hospital care, prescription drugs, and other care but not covering vision and dental care, were estimated at 75.5 billion dollars⁵. As the baby boomer generation continues to enter older age and increase their need for medical services, a rise in medical expenditures is already a surety even without accounting for extra smoking-related costs.

4.5 million adults sixty years old or older are smokers in the United States and the elderly poor are a particularly vulnerable group for smoking^{6, 7}. Cigarette smoking continues to be the leading cause of premature mortality due cardiovascular disease and cancer for this age group contribute the premature mortality due to cigarette smoking⁸. The Center for Disease Control indicates that 10% of adults over 65 years old are current smokers⁹ and approximately 70% of annual smoking-related deaths occur among those over 60 years old¹⁰. Smoking in older age is correlated with 7 of the 14 top causes of death with people aged 60 years old and over¹¹.

Negative health consequences due to smoking include heart disease, ulcers, high blood pressure, vascular disease and diabetes¹². Elderly smokers experience the cumulative negative health effects of smoking. They also experience certain health conditions complicated by smoking in higher percentages than in younger people. The risk of dying from a heart attack is in fact, sixty percent higher for smokers compared to nonsmokers who are 65 years old or older¹³. Risk of lung cancer incidence and mortality can also be reduced by quitting smoking at almost any age¹⁴. In an a pooled analysis of 3 cohort studies, even men who quit at ages 60-69 showed a 40% reduction in lung cancer mortality when they reached age 70-79 compared to continuing smokers¹⁵.

Several studies have shown health benefits of quitting smoking after middle-age and the 1990 Surgeon General Report states that smoking cessation strongly recommends smoking cessation in patients of all ages¹⁶. There are immediate benefits in decreasing the risk of heart disease and stroke and long-term benefits for lung function. The CDC found that a year after smoking cessation, the excess risk of heart disease caused by smoking reduced by about 50%. About 10 years after cessation, the risk of lung cancer for former smokers is less than half of that of a persisting smoker¹⁷.

It is important to consider the unique characteristics of the elderly smoking population when considering the implementation of smoking cessation programs because older adults are more likely to be long term smokers, heavier smokers, and individuals with smoking-related chronic diseases. The elderly are more likely to have higher levels of addiction, be less likely to attempt smoking cessation, but be more likely to successfully quit compared to younger smokers¹⁸. Nearly 70% of adult smokers want to quit smoking with 41% having made a quit attempt for the duration of at least 1 day in the last year¹⁹. However, there are also specific barriers to initiating smoking cessation attempt and following through a treatment program. Many elderly believe that there are few perceived health benefits of smoking cessation and many believe that quitting smoking at their age has no health benefits²⁰. Some report that fatalism and feel that they will die anyway and are unable to make the links between stopping smoking and years of life saved. Others stress the pleasure that they obtain from smoking cigarettes and want to hold onto the things that continue to give meaning and pleasure²¹.

Identifying meaningful and appropriate predictors of smoking cessation is essential to increasing smoking cessation rates in the elderly population. There are a range of possible predictors of smoking cessation among the elderly in the literature. Some of these include gender, race, depression, and level of nicotine dependence^{22, 23}. Having a diagnosis of a smoking-related illness is also a strong predictor of whether a smoking cessation attempt will be initiated. Others involve the social context of the individual and include whether the elderly smoker is married to a non-smoker or has a supportive family environment that encourages smoking cessation. Having less psychological distress, being motivated to quit, and believing that therapy will work are also all relevant factors²⁴.

Considering that smoking cessation programs are amongst the most cost-effective^{25, 26} interventions in health care, it is important that we consider it a foremost priority.

Zimbardo defines time perspective into five major constructs. Past negative, past positive, present fatalistic, present hedonistic and future.

Generally those who are past oriented tend to focus on past experiences and choices. Individuals who are past oriented are uncomfortable with the unfamiliar and are hesitant to change²⁷. They prefer to be by themselves or maintain existing relationships. While these individuals take past experiences into account they tend not to make decisions that will inform their future goals²⁸. Zimbardo further divides individuals with a past orientation into either being past negative or past positive. Being past negative in particular means that an individual has a negative perception of one's past experiences²⁹. Commonly, this way of thinking can result from either experiencing a traumatic event in the past or reconstructing a past event in a negative way³⁰. Examples of questions asked to assess this domain include, "Painful past experiences keep being replayed in my mind" and "Even when I am enjoying the present, I am drawn back to comparisons with similar past experiences." Individuals who are present negative tend to be depressed, aggressive, anxious, and have low self-esteem.

Being predominantly past positive indicates that you maintain a positive perception of your past. Those who are past positive tend to focus on past experiences but tend to have high self-esteem and are generally happy³¹. They are unlikely to be depressed, aggressive or have anxiety³². Examples of items within this category include “Happy memories of good times spring readily to mind” and “Familiar childhood sights, sounds and smells often bring back a flood of wonderful memories.”

Individuals who have a present orientation focus on the issues surrounding them in their current context. They tend to focus on the moment and do not focus on future consequences or refer to the past. These individuals are mostly unable to delay gratification and tend not to plan³³. Individuals who are present orientated are further classified as either being present fatalistic or present hedonistic.

Individuals who are present fatalistic believe that they have no control in their current life or in informing the future. Those with this orientation feel that their individual actions will not have an impact on their current situation or the future. Hence, they tend to avoid planning³⁴. Individuals who are present fatalistic tend to have lower levels of self-efficacy and a negative self-image³⁵. Examples of items within this domain are “You can’t really plan for the future because things change so much” and “It takes joy out of the process and flow of my activities, if I have to think about goals, outcomes, and products.”

Individuals who are present hedonistic tend to live in the moment and focus on issues related to their immediate situations and surroundings. Those with this orientation tend not to be motivated by rewards or believe that one can learn from the past. They make decisions that focus on immediate consequences and do not value how their present actions may lead to negative future consequences. People with this orientation tend to seek immediate gratification and to engage in high-risk behaviors. Those who are present hedonistic tend to be associated with novelty seeking or sensation seeking³⁶. Examples of questions within this domain include “It is more important for me to enjoy life’s journey than to focus only on the destination” and “I try to live my life as fully as possible, one day at a time.”

Individuals who are future oriented are focused on the future and are able to delay gratification for future goals. They also tend to make decisions and take actions that will benefit them for the future³⁷. Because they are concerned with the future outcomes of their present behavior, they plan more and are less inclined to take physical risks³⁸. They monitor their present behavior to attain the necessary future outcomes³⁹. Individuals who are future-oriented tend not to focus on the present circumstances⁴⁰, are conscientiousness and like consistency. Those who are future-oriented tend not to be depressed, aggressive or sensation seekers⁴¹. Examples of this category include “I keep working at difficult uninteresting work if it will help me get ahead” and “When I want to achieve something, I set goals and consider specific means for reaching those goals.”

Time perspective may be an important predictor of success in smoking cessation programs. Thus, it is important to better understand the role of time perspective for smoking cessation. More specifically, there needs to be a greater understanding of the role

that time perspective plays in initiating a quit attempt and in the success of that quit attempt. We hope the information generated from this study will allow us to better understand the role of time perspective and behavior change and to make recommendations for improving smoking cessation treatment programs. Such a project would be valuable because it would allow for identification of specific attributes of the individuals who are more likely to succeed in a smoking cessation intervention and for tailoring of referrals to different forms of smoking cessation treatment to make them better matched to individual recipients. This individualized approach would conserve resources by allocating patients more appropriately to treatment. Gaining a clearer perspective on the relationship between time orientation and smoking cessation outcome will help us understand if treatment programs are appropriately designed for those who enter such programs.

Although there is some information relating time perspective to substance use there is only limited information on the role of time perspective in individuals' making a smoking cessation attempt and whether it fluctuates for those trying to quit. Time perspective may be an important predictor of treatment response in smoking cessation programs. More specifically, there needs to a greater understanding of the role that time perspective plays in initiating a quit attempt and in the success of that quit attempt. Gaining a clearer perspective on the relationship between time orientation and smoking cessation outcome will allow us to guide patients with different time perspectives to appropriate smoking cessation treatment programs.

The Zimbardo Time Perspective Inventory is commonly used in research related to alcohol^{42, 43, 44} and drug use^{45, 46}. There is also an interest in examining the role of time orientation in assessing health risk and behavior patterns in health including HIV⁴⁷, cardiac behaviors⁴⁸ and smoking^{49, 50}. However, in many instances a short version of the scale is used and in others only certain domains are used. There is a need to examine the use of the scale with all five domains in an ongoing intervention trial focused on a health outcome. Such a study will be valuable because it will highlight the importance of specific domains of time orientation that are the most relevant to understanding smoking behavior and for smoking cessation. This study will allow us to identify who is more likely to succeed in a smoking cessation intervention, provide information for tailoring of referrals and give us information to appropriately modify smoking cessation programs to make them better matched to individual recipients.

Studies of predictors for smoking cessation have largely focused on sociodemographic factors and smoking characteristics of participants. Several have found that gender is a predictive measure of success⁵¹. Education⁵² and age⁵³ are other demographic variables that are commonly used to explain greater success in smoking cessation. Studies examining the number of previous quit attempts⁵⁴ and/or the longest duration of previous abstinence^{55, 56, 57} also are common in the literature. Another significant predictor in many studies is level of nicotine dependence^{58, 59}. Some studies have looked at time to first cigarette⁶⁰ as an indicator of level of dependence; others have investigated scores from the Fagerstrom Test for Nicotine Dependence^{61, 62}.

Social factors related to smoking behavior also have been studied as predictors of smoking cessation treatment outcome. Collins et al⁶³ hypothesize that social influence processes are more important predictors of long-term outcome. A commonly studied significant factor is whether the individual attempting to quit has friends who are smokers^{64, 65}, lives with smokers⁶⁶, or is in general proximity to other known smokers^{67, 68}. The relationship between marital status and smoking cessation is variable across studies. Some studies have reported a significant association between being married and smoking cessation^{69, 70} while others have not⁷¹.

The relationship between psychosocial factors and smoking cessation has also been examined. Among psychosocial factors, time perspective is a promising characteristic that might be associated with both the degree of interest in quitting and in the likelihood of successfully quitting. Some personality factors include the level of risk-taking behavior, sensation seeking, novelty seeking and ADHD. However, many of these studies examine the role of personality factors in the initiation of smoking and are focused on adolescents^{72, 73}. Common measures that are used to examine personality include the Eysenck Personality Questionnaire (extraversion, introversion, neuroticism, lie, psychoticism), Karolinska Scales of Personality (personality traits), Tridimensional Personality Questionnaire (novelty-seeking, harm-avoidance, reward-dependence, sentimentality, persistence), and the Personality Diagnostic Questionnaire (paranoid, antisocial, obsessive-compulsive).

A study by Carton⁷⁴ evaluated a wide range of possible personality characteristics including emotional disturbances, anxiety, and depressive symptoms as predictors in a smoking cessation intervention. He found that sensation seeking was a positive predictor as have several other studies^{75, 76, 77}. Other studies demonstrated a link between novelty seeking and smoking^{78, 79, 80}. Possessing antisocial and fewer extraverted characteristics were also commonly significant^{81, 82, 83}. However, existing studies on personality factors are limited in the number of subjects enrolled, the types of personality factors that are examined, and in examining the direct role of certain personality factors to a particular quit attempt. A more rigorous examination of individual personality factors is an essential in understanding the predictors that lead to long-term abstinence.

Thus, it is important to better understand the relevance of the present, past, and future domains in the context of an on-going intervention trial and to gain information of the saliency of these constructs on health behavior during an intervention. Studies have found positive correlation between present time perspective and substance users. People with present time perspective are more likely to report using alcohol, drugs, and tobacco⁸⁴. Future orientation is inversely related to substance use⁸⁵. In a study of opiate-injecting drug users, researchers found a present time perspective tended to characterize those who were currently injecting, whereas a future time perspective was more prevalent among those who had ceased opiate injections⁸⁶.

A few studies have begun to examine the role of time perspective and smoking and found that examining time orientation as a predictor of outcome is a worthwhile endeavor. In a study by Adams⁸⁷, they examined the role of time perspective in older

English adults. They found that being future orientated increased effectiveness of smoking cessation interventions by using a question on financial planning as a proxy measure of time orientation. Two other studies have examined the role of time orientation and smoking^{88, 89}. Jones⁹⁰ et al examined whether smokers had a specific orientation and compared future orientation to impulsivity. They hoped to examine whether smokers tended to be less future oriented and impulsive. Adams⁹¹ examined whether time perspective mediates socioeconomic inequalities in smoking. These studies have begun to acknowledge the importance of time orientation in health behaviors, particularly smoking. Studies that been conducted on time have used proxy measures, focused only on particular domains of time orientation and have used a range of instruments and methods for assessing time orientation. There continues to be a need to examine time orientation directly, to examine the range of time orientation including present, past and future domains, and a need to examine time orientation in the context of an intervention to assess whether it can be a predictive variable for smoking cessation programs.

Previous studies of smoking cessation predictors and outcomes have been limited to demographic, smoking health habits, and some psychosocial factors. Gaining a clearer perspective on the relationship between time orientation and smoking cessation outcome will help us understand if treatment programs are appropriately designed for those who enter such programs.

The proposed study investigated time orientation as a predictor of individuals' successfully completing a smoking cessation treatment program. The aims of this study are to identify the time orientation of patients at entry into a smoking cessation program and to explore the relationship of time orientation to other potential predictors of smoking cessation.

In Chapter 1, we will assess the validity of the Zimbardo Time Perspective Inventory in an on-going intervention trial. We hoped to validate psychometric data on the Zimbardo Time Perspective Inventory in an adult population at the initiation of an intervention. We will use exploratory factor analysis to determine the most appropriate number of dimensions. We are limiting the number of dimensions a priori because the scale is being tested in an older, adult population and we want to fully explore what domains are most relevant for this population. Previous factor analyses of the Zimbardo Time Perspective Inventory have been conducted in younger populations, predominantly those who were students.

In Chapter 2, we will identify the time orientation of patients at entry into a smoking cessation program and to explore the relationship of time orientation to other potential predictors of smoking cessation. We will conduct a cross-sectional analysis and then examine how time orientation varies across socioeconomic factors of the population. We will also examine whether a single item of the Zimbardo Time Perspective Inventory proves to be more predictive than a domain of the scale. Having a single item that could be used to screen participants in health care settings would alleviate the time necessary to

classify an individual by time orientation and allow for tailoring of health interventions to match individual to treatment.

In Chapter 3, we will examine the change for each individual item of the Zimbardo Time Perspective Inventory and number of cigarettes smoked from baseline to six months post-intervention. We will also assess change for each of the five domains, present fatalistic, present hedonistic, future, past negative and past positive and number of cigarettes smoked from baseline to follow-up.

Characterizing the time orientation of smokers and its relation with smoking cessation is the first step toward designing future tailored smoking cessation interventions that would better meet the cessation needs of smokers. Because of the substantial health, quality of life and economic benefits of smoking cessation, even later in life, determining if time perspective is a predictor of success could have a potentially large impact on public health. Such a study would be valuable because it would allow for identification of specific attributes of the individuals who are more likely to succeed in a smoking cessation intervention and would allow for tailoring of referrals and for appropriate modification of smoking cessation programs to make them better matched to individual recipients.

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The Psychometric Evaluation of the Zimbardo Time Perspective Inventory in an Older Smoking Population

INTRODUCTION

Time is a process that can be influenced by social demographic factors. It can be categorized predominantly into past, present and future orientations, and it can be used for encoding, storing, and recalling past events. Present time can be described as an orientation in which a person has tendencies towards self-indulgence, immediate gratification, high-risk behavior, and avoidance of tasks that involve work, effort, or planning. In contrast, future time is an orientation that is concerned about the avoidance of risk, planning for the future, and the implications of present behavior for the future. Orientations to time are also fundamental for forming expectations, goals, contingencies, and imaginative scenarios¹.

Studies of time orientation have used a wide range of scales, including descriptive assessments such as the TAT² and the Cottles circle test³. However, descriptive assessments have a tendency to be biased and be influenced by the interviewer. Other research is based on questionnaires that include questions about time preferences and orientation, such as assessments by Gjesme⁴, Heimberg⁵, Strathman⁶ and Wallace⁷. These assessments focus on broad measurements of time instead of going into detail about specific attributes of the major time orientations such as past negative, past positive, present hedonistic or present fatalistic. Some research is based on adaptations of existing measures⁸, isolated components or domains from existing measures⁹ or new scales^{10, 11} to assess time orientation. More recently, studies utilize individual items from larger questionnaires as proxy measures of time orientation^{12, 13}.

One of the most utilized scales for assessing time orientation in the context of health behavior is the Zimbardo Time Perspective Inventory (ZTPI). This questionnaire-based measure is commonly used to assess risky behavior ranging from driving¹⁴ to substance use¹⁵ to behavior patterns in diabetes screening programs¹⁶. The Zimbardo Time Perspective Inventory is commonly used in research related to alcohol^{17, 18, 19} and drug use^{20, 21}. There is also an interest in examining the role of time orientation in assessing health risk and behavior patterns in health including HIV²², cardiac behaviors²³ and smoking^{24, 25}.

The Zimbardo Time Perspective Inventory is one of the most comprehensive and utilized questionnaire. However, making comparisons of the scale across populations and for different health outcomes is difficult. In many instances a short version of the scale is used and in others only certain domains are used. There is a need to examine the use of the scale with all five domains, present hedonistic, present fatalistic, future, past negative, and past positive in an ongoing intervention trial focused on a common health outcome. Such a study will be valuable because it will highlight the importance of specific domains of time orientation that are the most relevant to understanding smoking behavior and for smoking cessation. This study will allow us to identify who is more likely to succeed in a smoking cessation intervention, provide information for tailoring of referrals and give us information to appropriately modify smoking cessation programs to make them better matched to individual recipients.

The goal of this methodological study was to assess the validity of the Zimbardo Time Perspective Inventory in an on-going intervention trial. We hope to

validate psychometric data on the Zimbardo Time Perspective Inventory in an adult population at the initiation of an intervention. This study provides a unique opportunity to examine this emerging construct in a broad population and in the context of a health outcome.

METHODS

Study Setting

Participants for this study were recruited from a larger smoking cessation study, the Quitline study, a primary-care based Telephone Care Coordination Program (TCCP) for smoking cessation throughout the VA Sierra Pacific Healthcare Network. The goals of the Quitline study were to implement a system to increase referrals to a state Quitline in a more efficient manner and to promote long-term abstinence from smoking. Participants for this study were recruited from the Northern California division. All participants were referred from their primary care physician into the telephone-based smoking cessation intervention and were given brief smoking cessation counseling from their provider and smoking cessation medications.

Participants

Participants in the study are men and women over the age of eighteen who were seen in clinics throughout the VA Sierra Pacific Healthcare Network. We enrolled 150 participants through the Quitline Study. When patients were contacted by the care coordinators for the Quitline Study, they were asked if they would agree to be contacted to review eligibility for a research study examining predictors of smoking cessation outcome. Telephone Care Coordinators maintained a list of names and phone numbers of interested participants. Research staff obtained the list and contacted interested patients daily. The research assistant contacted the prospective participant by phone and asked for verbal consent and an interview time was scheduled for the baseline intake before the quit date. The telephone interview lasted approximately forty-five minutes. We administered a survey before their scheduled quit date and had follow-up telephone-based interviews at four weeks and six months after the baseline assessment.

Survey methodology

Study participants received all treatment as defined by the intervention as part of the Quitline Study. Upon enrolling in this study, they completed a questionnaire before their quit date that assessed their baseline time orientation before the start of the intervention and other smoking characteristics. The research interviewer contacted the subjects by telephone again at four weeks and six months after the quit date.

Measures

The survey took approximately forty-five minutes to complete and included questions on smoking characteristics including patients' level of dependence, current smoking status, age at which first smoked and previous relapse history. Patients completed items assessing perceived stress, social support and time perspective. Each of the scales administered at baseline is described below:

Perceived Stress Scale

The Perceived Stress Scale (PSS) was developed to measure perceptions of stress. In addition to directly measuring levels of current stress, the scale was designed to provide information on how unpredictable and uncontrollable events can be and the influence of such events on stress. All scores were obtained by summing the 5-point Likert scale responses across the 10-items. Four items (items 4, 5, 7, and 8) were written negatively and were reverse-coded prior to summing across the ten total items. The mean score among men was 12.1 and 13.7 among women and was consistent across racial groups and had an alpha coefficient of 0.78²⁶. The mean scores on the Perceived Stress Scale were the highest amongst the 18-29 age group and the lowest among the 55-64 age group²⁷. Using the 5-point Likert scale ranging from never (0) to very often (4) participants were asked to indicate how often they felt or thought about each item during the last month.

Multidimensional Scale of Perceived Social Support

The Multidimensional Scale of Perceived Social Support was used to assess perceived social support. Three factors (family, friends and significant others) were primarily used to contextualize perceptions of social support. This 12-item self-report measure used a 7-point Likert scale ranging from very strongly disagree (1) to very strongly agree (7). Items that focused on family asked about communication with family and extent of emotional support received and items on support from friends assessed the degree to which a person can count on a friend and whether friends are there to help.

Scores for the Multidimensional Scale of Perceived Social Support were summed across all items to give a total score and also summed to give scores for social support related specifically to family, friends and significant others. A higher score indicated a greater level of social support. Authors reported a coefficient alpha of 0.91 for the significant other domain, 0.87 for family domain and 0.85 for the friend domain. They obtained a coefficient alpha of 0.88 for the scale in entirety and strong test-retest reliability (0.85) and construct reliability for the scale²⁸.

Psychometric properties of the scale have been shown to be valid and reliable in younger adults^{29, 30} and in older adults³¹. Stanley³² examined the use of the scale among an elderly population with psychiatric disorders and found similar psychometric properties including a three factor solution.

Zimbardo Time Perspective Inventory

The Zimbardo Time Perspective Inventory measures an individual's beliefs, preferences, and values regarding temporary experiences and takes motivational, emotional, cognitive and social aspects into account. It has been used predominantly in examining risky behaviors including alcohol, drug and overall risk perception. Questions are asked in a 5-point Likert format that ranges from 1 to 5 where 1 indicated that the participant found the item to be very uncharacteristic and 5 indicated that the participant found the item very characteristic. Psychometric properties of the scale have shown that the past negative and the future subscales of the Zimbardo Time Perspective Inventory

are distinct from sensation seeking, novelty seeking, depression and reward dependence and conscientiousness^{33, 34}.

Five factors (past negative, past positive, present fatalistic, present hedonistic and future) are primarily used to contextualize perceptions of time orientation. Generally those who are past oriented tend to focus on past experiences and choices. Individuals who are past oriented are uncomfortable with the unfamiliar and are hesitant to change³⁵. Zimbardo further divides individuals with a past orientation into either being past negative or past positive. Being past negative in particular means that an individual has a negative perception of one's past experiences. Commonly, this way of thinking can result from either experiencing a traumatic event in the past or reconstructing a past event in a negative way³⁶. Examples of questions asked to assess this domain include, "Painful past experiences keep being replayed in my mind" and "Even when I am enjoying the present, I am drawn back to comparisons with similar past experiences." Being predominantly past positive indicates that you maintain a positive perception of your past. Those who are past positive tend to focus on past experiences but tend to have high self-esteem and are generally happy³⁷. Examples of items within this category include "Happy memories of good times spring readily to mind" and "Familiar childhood sights, sounds and smells often bring back a flood of wonderful memories."

Individuals who have a present orientation focus on the issues surrounding them in their current context. They tend to focus on the moment and do not focus on future consequences or refer to the past. These individuals are mostly unable to delay gratification and tend not to plan³⁸. Individuals who are present oriented are further classified as either being present fatalistic or present hedonistic. Individuals who are present fatalistic believe that they have no control in their current life or in informing the future. Those with this orientation feel that their individual actions will not have an impact on their current situation or the future. Examples of items within this domain are "You can't really plan for the future because things change so much" and "It takes joy out of the process and flow of my activities, if I have to think about goals, outcomes, and products." Individuals who are present hedonistic tend to live in the moment and focus on issues related to their immediate situations and surroundings. Those with this orientation tend not to be motivated by rewards or believe that one can learn from the past. They make decisions that focus on immediate consequences and do not value how their present actions may lead to negative future consequences³⁹. Examples of questions within this domain include "It is more important for me to enjoy life's journey than to focus only on the destination" and "I try to live my life as fully as possible, one day at a time."

Individuals who are future oriented are focused on the future and are able to delay gratification for future goals. They also tend to make decisions and take actions that will benefit them for the future⁴⁰. Because they are concerned with the future outcomes of their present behavior, they plan more and are less inclined to take physical risks⁴¹. They monitor their present behavior to attain the necessary future outcomes⁴². Examples of this category include "I keep working at difficult uninteresting work if it will help me get ahead" and "When I want to achieve something, I set goals and consider specific means for reaching those goals."

Zimbardo reported an overall Cronbach's alpha of the scale at .82 and found that the total variance explained by the sum of the five domains was 36%. Test-retest

reliabilities were conducted among undergraduate students after a period of 4 weeks with the highest reliability for the future subscale (0.8), 0.76 for both present fatalistic and past positive subscales, 0.72 for present hedonistic and 0.7 for the past negative. Zimbardo also assessed validity by conducting convergent and discriminant validity with the Buss and Perry Aggression Questionnaire, Beck Depression Inventory, Conscientiousness scale, Strathman Consideration of Future Consequences Scale, Ego-Control Subscale, Impulse Control Subscale, and the Novelty Seeking subscale from the Tridimensional Personality Questionnaire.

Statistical plan

We calculated means and standard deviations for each item to examine variability of each item across the sample. We used exploratory factor analysis to allow us to determine the most appropriate number of dimensions. We did not want to limit the number of dimensions a priori because the scale was being tested in an older, adult population. Previous factor analyses of the Zimbardo Time Perspective Inventory have been conducted in younger populations, predominantly those who were students. We conducted an exploratory factor analysis using varimax rotation and used scree plots to identify the number of domains. We also calculated Cronbach’s alpha to examine the internal validity of each of the five domains of the Zimbardo Time Perspective Inventory. We also examined correlations between each of the domains using Pearson correlation coefficients.

Data Management and Quality Assurance

IBM-compatible computers were used to store and track the data. Research interviewers underwent training and evaluation prior to initiation of data collection. Questionnaires were piloted, both for ease of administration and accuracy of coding. All data were double-entered and range and logic checks were used during data entry. The study investigators met weekly with project staff to oversee data collection procedures and resolve questions. An operations manual with detailed instructions regarding data collection was devised prior to initiation of data collection and revised as needed during the study.

RESULTS

Patient Characteristics

Demographics of the study sample are presented in Table 1. The majority (95%) of the participants were men. Thirty percent of the participants were high school educated, fourteen percent had a bachelor’s degree and 47% had attended college for some time. Thirty-seven percent of the participants worked part or full-time, 26% were retired, and 28% were disabled. The participants had incomes that ranged across the gradient with many participants below \$34,000 per year (45%).

Table 1: Demographic Characteristics of Study Sample (n=150)

Gender	Number (%)
Male	143 (95)
Female	7 (5)

Total		100
Education		
	High School or less	43 (30)
	Post secondary	7 (4)
	Some college	71 (47)
	Bachelor's degree	21 (14)
	Some graduate	8 (5)
Total		100
Employment		
	Employed part or full-time	55 (37)
	Retired	40 (26)
	Unemployed	10 (7)
	Disabled	42 (28)
	Other	3 (2)
Total		100
Income		
	0-34,000	67 (45)
	35,000-49,000	32 (21)
	50,000-74,000	25 (17)
	75,000 & above	19 (12)
	Other	7 (5)
Total		100

Participants in this sample started smoking at an early age and have been smokers for most of their adult lives. Most of the participants started smoking between eleven and nineteen years old (74%) and only six participants initiating smoking after the age of thirty (4%). Eighty-nine percent of the participants have been smoking for over twenty years and only eleven percent of the participants have smoked for fewer than twenty years. Participants also tended to be heavy smokers. Over half of the participants smoked one pack or more a day and the majority (96%) smoked daily.

Table 2: Smoking Characteristics of the Study Sample (n=150)

Age first smoked		
	0-10	6 (4)
	11-19	111 (74)
	20-29	27 (18)
	30 & above	6 (4)
Total		100
Years smoked		

	0-10	8 (5)
	11-19	9 (6)
	20-29	24 (16)
	30 & above	109 (73)
Total		100
Cigarettes smoked per day		
	0-10	56 (37)
	11-19	15 (10)
	20-29	53 (36)
	30 & above	26 (17)
Total		100
Days per week smoke		
	Once a week	2 (1)
	Daily	143 (96)
	Other	5 (3)
Total		100

Exploratory factor analysis

We conducted an exploratory factor analysis to assess the underlying structures of the scale and determine whether the domains in the scale were different based on the unique population it was being tested on. We performed an exploratory factor analyses to examine the number of domains necessary for the scale. In addition, we utilized scree plots to give us an additional criteria. Factors were retained if they had an eigenvalue greater than 1. We compared varimax rotated approach to the varimax unrotated approach to fully compare factor loadings and uniqueness values. The scree plot suggested a 5 factor solution and was found to be the best fit.

Exploratory factor analysis revealed a five factor model. The eigenvalues of each of the Factors from 1 to 5 were 8.12, 4.48, 2.56, 2.21 and 1.63 respectively. The highest eigenvalue representing the first factor corresponded to the past negative domain. The first factor contributed the most with 9% of the variance explained and factors 2-5 explained 7%, 7%, 6%, and 6%, respectively. The total variance explained by the sum of the five factors was 35%.

Scale characteristics

We calculated the time orientation score by summing across all 56 items and dividing by the total number for an overall score. We obtained averages for each of the five domains separately as well. Domain-domain correlations were 0.41 (future-past positive), -0.51(future-present fatalistic), -0.1(future-past negative), -0.1(future-present hedonistic), -0.25 (past positive-present fatalistic), -0.28 (past positive-past negative), -0.01 (past positive-present hedonistic), 0.61 (present fatalistic-past negative), 0.41 (present fatalistic-present hedonistic), and 0.43 (past negative-present hedonistic). See Table 3 for correlations between each of the domains.

Table 3: Correlations among Five domains of the Zimbardo Time Perspective Inventory at Baseline

	Future	Past Positive	Present Fatalistic	Past Negative	Present Hedonistic
Future	1.000				
Past Positive	0.414	1.000			
Present Fatalistic	-0.509	-0.253	1.000		
Past Negative	-0.092	-0.278	0.608	1.000	
Present Hedonistic	-0.108	-0.011	0.405	0.428	1.000

Table 4 summarizes all the mean scores by item. Higher scores indicated that a specific time orientation is more likely to reflect the individual's predominant time orientation. Scores for time orientation were assessed across all five domains and each participant was also given a score for each domain. Scores for the past negative subscale ranged from 1.4-4.9 and had a mean of 3.27. The present hedonistic subscale ranged from 1.9-4.5 and had a mean of 3.24. The future subscale ranged from 2-4.69 and had a mean of 3.55. The past positive ranged from 1.44-4.78 and had a mean of 3.33 and the present fatalistic ranged from 1.22-4.22 and had a mean of 2.67.

Table 5 shows the factor loadings for the items related to the Zimbardo Time Perspective Inventory. The first factor was comprised of 9 items (16, 22, 25, 33, 34, 36, 41, 50 & 54) and had loadings that ranged from -0.28 to 0.75. Items related to Factor 1 were very similar to Zimbardo's past negative domain. In fact, 7 of the 10 items corresponded directly with the original domain. Only three items from the original Zimbardo Time Perspective Inventory (items 4, 5, 27) did not cluster with Factor 1 and item 41 was included. Factor 2 was comprised of 4 items (1, 31, 42, 48) and had loadings that ranged from 0.21 to 0.79. This factor had items were related to the present hedonistic subscale. The original present hedonistic scale is comprised of 15 items. Factor 3 was comprised of 6 items (14, 18, 37, 38, 39, 47) and had loadings that ranged from -0.1 to 0.72. Five of the six items were related to the original present fatalistic subscale. One of the items (18), had a factor loading of -0.1 and corresponded to the future subscale. Four items that are originally part of the present fatalistic scale (3, 35, 52, 53) did not cluster together with this group. Factor 4 was comprised of 5 items (8, 12, 23, 44, 46) and had loadings that ranged from 0.21 to 0.74. This factor had items were part of the original present hedonistic subscale. These items all correlated to the original domain of present hedonistic subscale. Factor 5 was comprised of 7 items (5, 6, 9, 24, 26, 43, 51) and had loadings that ranged from 0.24-0.80. This factor had 5 items were related to the future subscale and 2 that were not. Factor 6 was comprised of 6 items (2, 7, 11, 15, 20, 49) and had loadings that ranged from 0.22 to 0.80. This factor had items were related to the past positive subscale. These items all correlated to the original domain of past positive subscale. Table 6 shows the results by factor. The results of the

factor analysis confirm our original hypothesis that the majority of the domains of the scale would hold up in this population.

We hypothesized that our exploratory factor analysis would reflect a five factor structure comprised of present hedonistic, present fatalistic, future, past negative, and past positive domains. It is interesting to note that the past negative, past positive, and past hedonistic clustered together better in this population than the future and the present fatalistic subscale.

DISCUSSION:

Time orientation is recognized as a psychosocial factor related to health risk assessment, prevention, and disease outcomes. There is a growing use of time to understand health differences in populations, but little consensus about the best way to assess time and its health effects, especially across the life course. The purpose of this methodological study was to assess the validity of the Zimbardo Time Perspective Inventory in an adult population at the initiation of a smoking intervention. This study provides a unique opportunity to examine this emerging construct in a broad population and in the context of a health outcome.

Participants in the study were administered a telephone-based interview assessing their time orientation at the initiation of their smoking cessation attempt. The scale was administered to 150 participants to determine the psychometrics of the scale and its relationships to Perceived Stress Scale, Multidimensional Scale of Perceived Social Support and other demographic variables. Reliability analysis of 150 questionnaires confirmed that the responses to the Zimbardo Time Perspective Inventory and subscales were internally consistent and reliable.

Our hypothesis that the scale would be valid in this population held true. Our exploratory factor analysis was strong on all of the five factors that are part of the original Zimbardo Time Perspective Inventory. The future domain had the least number of items that clustered together and the present hedonistic domain was split into two separate factors.

The Zimbardo Time Perspective Inventory has been one of the more consistent measures of time orientation in the literature and one that is utilized frequently to assess health risk and prevention. However, different versions of the scale have been used across studies. Some studies have used a “short scale,” the Stanford Time Perspective Inventory, consisting of 38 items while others have only used certain domains of the Zimbardo Time Perspective Inventory in their studies. Most frequently the present and future domains are used either by themselves or together. Studies have shown that present orientation corresponds with riskier behavior. Other studies have simultaneously shown that possessing a future orientation informs preventative behavior.

The Zimbardo Time Perspective Inventory has most commonly been used in studies examining alcohol and drug use. The majority of these studies^{43, 44, 45, 46} have used the 38-item, Stanford Time Perspective Inventory to assess time orientation in substance users. Wills⁴⁷ used a 21-item version of the Stanford Time Perspective Inventory amongst adolescents to assess tobacco, alcohol, and drug use with time orientation and found that present orientation predicted substance use and that a future orientation was inversely related to substance use. More recently, Levy⁴⁸ used the future domain and found a strong construct validity of the domain (alpha coefficient = .83) for

the future subscale among alcoholics. Most studies typically found that the future domain was the most valid of the subscales^{49, 50}. In most cases, it explained the majority of the variance of the scale (14.6%); had the highest eigenvalues (4.8) and the highest alpha coefficients (0.74) in comparison to the other subscales⁵¹.

It's interesting to note that the future and present are the most robust subscales in most in other population samples. In a study examining HIV risk, Rothspan⁵² found that present and future domains were negatively correlated. Using a 38 item scale she found that (Hedonism, $r=-.42$, $p<.001$; Fatalism, $r=-.21$, $p<.01$) and that the two subscales of present were correlated as were the two subscales of future. However, in this sample, the domain with the highest eigenvalue (8.12) was the past negative subscale and the future domain did not hold together in factor analysis as well as the other domains. This could in part be explained by the age of the participants. Most of the studies examining the psychometric properties of the Zimbardo Time Perspective Inventory have been conducted in younger populations, most often in undergraduates. There is data that supports the shortening of future time orientation with increasing age.

The Zimbardo Time Perspective Inventory has also been used to assess preventative behavior and participation in screening programs and smoking. The Zimbardo Time Perspective Inventory scale is comprised of five subscales generally measuring past, present and future domains. An individual ideally achieves a balanced time orientation in their daily lives. On average, in this population, we did see that the five domains of time perspective were evenly distributed across the participants as a whole. Participants showed a range of time orientation with the highest mean (3.55) in the future subscale and the lowest mean (2.67) in the present fatalistic scale. Published means of future domain scale range from 3.18⁵³; 3.4⁵⁴; 3.25-3.56⁵⁵; to 3.54⁵⁶. Means for the present fatalistic domain are 2.41⁵⁷; 2.56⁵⁸; and 3.2⁵⁹.

Our results, which show a lower level of the present fatalistic domain, could be indicative of the participants general time orientation at baseline when they were about to enroll in and begin a smoking cessation program. It will be important to compare time orientations as participants make their way through the intervention and to assess whether the time orientation of the subjects stay the same or change.

Studies have also reported the alpha coefficients for the subscales within the Zimbardo Time Perspective Inventory. There also tends to be variation in the amount of variance explained by each of the domains and the number of factors obtained through factor analysis across studies. In terms of total variance, the scale has been reported to explain from 29% of the variance to 40%⁶⁰. D'Alessio⁶¹ determined that a 3-factor solution was the best fit and described them as future, hedonistic present, and fatalistic present domains. These three factors combined represented 30% of the variance. The future subscale represented 25.3% of the variance, the present hedonistic 18.8% of the variance and present fatalistic represented 21.1 of the variance. She was unable to find past as a specific domain her sample. She used a 22-item of the scale and also translated items into Italian and showed a Cronbach's alpha of 0.67 Zimbardo reported a total variance explained of 36% and we obtained a total variance explained of 35%. A recent study by Crockett⁶² found that a four factor solution was the best fit. In her sample, the future domain explained 11.1% of the variance (Cronbach's α of 0.66). She identified the second factor as present hedonistic and found that it explained 9.94% of the variance

(Cronbach's α of 0.61). The third and fourth factors explained 9.85% (Cronbach's α of 0.66) and 9.16% (Cronbach's α of 0.59) of the variance.

Our psychometric findings correspond to Zimbardo's psychometric findings of the scale. However, published studies utilizing the Zimbardo Time Perspective Inventory vary significantly in the number of factors obtained through factor analysis, variance explained and even in mean values for each of the separate domains. In part, these differences can be explained by the context in which time orientation was measured, the characteristics of the populations assessed and methodological differences in administering the scale. Most of the studies were conducted only to examine Zimbardo Time Perspective Inventory in unique populations, focused primarily on undergraduates, or were theoretical exercises making comparisons of the Zimbardo Time Perspective Inventory with other measurements of time orientation.

There is a growing interest in using the Zimbardo Time Perspective Inventory in studies with health outcomes and there needs to be a greater understanding of the psychometrics of the entire scale, an understanding of how the specific domains behave in general populations, and to understand how time orientation varies across the progression of a behavior change or outcome.

Limitations

Challenges include the context of measurement, culture within which measurement taking place, time along the life course at which measurement taking place and other psychosocial variants of individuals completing the scale. Although, there are these limitations, time perspective continues to remain a unique contributor when examining health risk behavior when compared to other psychosocial constructs.

Conclusion

Our data suggest that the Zimbardo Time Perspective Inventory is valid and reliable in an older, adult population. In addition, this study shows good validity of the Zimbardo Time Perspective Inventory in a population undergoing a health intervention. These results give us evidence to utilize the scale across the life course and in studies examining health outcomes. There continues to be a need to understand how time orientation influences health behavior and whether time orientation is behavior specific.

Table 4: Item Description and Descriptive Statistics for the Zimbardo Time Perspective Inventory (n=150)			
Item	Mean raw score	SE	95% CI
1. I believe that getting together with one's friends to party is one of life's important pleasures.	2.927	0.101	2.73 - 3.13
2. Familiar childhood sights, sounds, smells often bring back a flood of wonderful memories	3.493	0.097	3.30 - 3.68
3. Fate determines much in my life.	2.807	0.106	2.60 - 3.02
4. I often think of what I should have done differently in my life.	3.773	0.095	3.59 - 3.96
5. My decisions are mostly influenced by people and things around me.	2.693	0.104	2.49 - 2.90
6. I believe that a person's day should be planned ahead each morning.	3.453	0.095	3.27 - 3.64
7. It gives me pleasure to think about my past.	2.953	0.098	2.76 - 3.15
8. I do things impulsively.	3.160	0.107	2.95 - 3.37
9. If things don't get done on time, I don't worry about it.	3.173	0.106	2.96 - 3.38
10. When I want to achieve something, I set goals and consider specific means for reaching those goals.	3.887	0.083	3.72 - 4.05
11. On balance, there is much more good to recall than bad in my past.	3.673	0.091	3.49 - 3.85
12. When listening to my favorite music, I often lose all track of time.	2.867	0.101	2.67 - 3.07
13. Meeting tomorrow's deadlines and doing other necessary work comes before tonight's play.	3.573	0.091	3.39 - 3.75
14. Since whatever will be will be, it doesn't really matter what I do.	2.380	0.101	2.18 - 2.58
15. I enjoy stories about how things used to be in the "good old times."	3.667	0.088	3.49 - 3.84
16. Painful past experiences keep being replayed in my mind.	3.180	0.111	2.96 - 3.40
17. I try to live my life as fully as possible, one day at a time.	4.107	0.076	3.96 - 4.26
18. It upsets me to be late for appointments.	4.227	0.083	4.06 - 4.39
19. Ideally, I would live each day as if it were my last.	3.173	0.096	2.98 - 3.36

20. Happy memories of good times spring readily to mind.	3.547	0.082	3.39 - 3.71
21. I meet my obligations to friends and authorities on time.	4.213	0.064	4.09 - 4.34
22. I've taken my share of abuse and rejection in the past.	4.053	0.078	3.90 - 4.21
23. I make decisions on the spur of the moment.	3.153	0.101	2.95 - 3.35
24. I take each day as it is rather than try to plan it out.	2.833	0.096	2.64 - 3.02
25. The past has too many unpleasant memories that I prefer not to think about.	2.980	0.103	2.78 - 3.18
26. It is important to put excitement in my life.	3.507	0.090	3.33 - 3.68
27. I've made mistakes in the past that I wish I could undo.	3.987	0.087	3.81 - 4.16
28. I feel that it's more important to enjoy what you're doing than to get work done on time.	2.620	0.093	2.44 - 2.80
29. I get nostalgic about my childhood.	2.940	0.104	2.73 - 3.15
30. Before making a decision, I weigh the costs against the benefits.	3.700	0.083	3.54 - 3.86
31. Taking risks keeps my life from becoming boring.	3.060	0.098	2.87 - 3.25
32. It is more important for me to enjoy life's journey than to focus only on the destination.	3.687	0.085	3.52 - 3.86
33. Things rarely work out as I expected.	2.747	0.090	2.57 - 2.93
34. It's hard for me to forget unpleasant images of my youth.	2.913	0.107	2.70 - 3.12
35. It takes joy out of the process and flow of my activities, if I have to think about goals, outcomes, and products.	2.720	0.094	2.53 - 2.91
36. Even when I am enjoying the present, I am drawn back to comparisons with similar past experiences.	3.200	0.097	3.01 - 3.39
37. You can't really plan for the future because things change so much.	3.000	0.105	2.79 - 3.21
38. My life path is controlled by forces I cannot influence.	2.773	0.099	2.58 - 2.97
39. It doesn't make sense to worry about the future, since there is nothing that I can do about it anyway.	2.647	0.099	2.45 - 2.84
40. I complete projects on time by making steady progress.	3.847	0.075	3.70 - 3.99
41. I find myself tuning out when family members talk about the way things used to be.	3.173	0.098	2.98 - 3.37

42. I take risks to put excitement in my life.	2.747	0.094	2.56 - 2.93
43. I make lists of things to do.	3.100	0.106	2.89 - 3.31
44. I often follow my heart more than my head.	3.293	0.098	3.10 - 3.49
45. I am able to resist temptations when I know that there is work to be done.	3.540	0.082	3.38 - 3.70
46. I find myself getting swept up in the excitement of the moment.	3.033	0.095	2.85 - 3.22
47. Life today is too complicated; I would prefer the simpler life of the past.	3.033	0.103	2.83 - 3.24
48. I prefer friends who are spontaneous rather than predictable.	3.293	0.087	3.12 - 3.47
49. I like family rituals and traditions that are regularly repeated.	3.500	0.096	3.31 - 3.69
50. I think about the bad things that have happened to me in the past.	3.187	0.093	3.00 - 3.37
51. I keep working at difficult, uninteresting tasks if they will help me get ahead.	3.400	0.094	3.21 - 3.59
52. Spending what I earn on pleasures today is better than saving for tomorrow's security.	2.607	0.091	2.43 - 2.79
53. Often luck pays off better than hard work.	2.100	0.081	1.94 - 2.26
54. I think about the good things that I have missed out on in my life.	2.967	0.102	2.77 - 3.17
55. I like my close relationships to be passionate.	3.900	0.081	3.74 - 4.06
56. There will always be time to catch up on my work.	3.153	0.095	2.96 - 3.34

Table 5: Factor Loadings for the Zimbardo Time Perspective Inventory					
Questionnaire Item	Present fatalistic	Future	Present Hedonistic	Past Negative	Past Positive
1. I believe that getting together with one's friends to party is one of life's important pleasures.			0.276		
2. Familiar childhood sights, sounds, smells often bring back a flood of wonderful memories					0.377
3. Fate determines much in my life.	0.313				
4. I often think of what I should have done differently in my life.				0.716	
5. My decisions are mostly influenced by people and things around me.				0.271	
6. I believe that a person's day should be planned ahead each morning.		0.799			
7. It gives me pleasure to think about my past.					0.799
8. I do things impulsively.			0.743		
9. If things don't get done on time, I don't worry about it.		0.262			
10. When I want to achieve something, I set goals and consider specific means for reaching those goals.		0.719			
11. On balance, there is much more good to recall than bad in my past.					0.382
12. When listening to my favorite music, I often lose all track of time.			0.216		
13. Meeting tomorrow's deadlines and doing other necessary work comes before tonight's play.		0.338			
14. Since whatever will be will be, it doesn't really matter what I do.	0.718				

15. I enjoy stories about how things used to be in the “good old times.”					0.295
16. Painful past experiences keep being replayed in my mind.				0.746	
17. I try to live my life as fully as possible, one day at a time.			0.541		
18. It upsets me to be late for appointments.		-0.102			
19. Ideally, I would live each day as if it were my last.			0.258		
20. Happy memories of good times spring readily to mind.					0.438
21. I meet my obligations to friends and authorities on time.		0.612			
22. I’ve taken my share of abuse and rejection in the past.				0.165	
23. I make decisions on the spur of the moment.			0.649		
24. I take each day as it is rather than try to plan it out.		0.474			
25. The past has too many unpleasant memories that I prefer not to think about.				-0.344	
26. It is important to put excitement in my life.			0.254		
27. I’ve made mistakes in the past that I wish I could undo.				0.521	
28. I feel that it’s more important to enjoy what you’re doing than to get work done on time.			0.233		
29. I get nostalgic about my childhood.					0.683
30. Before making a decision, I weigh the costs against the benefits.		0.230			
31. Taking risks keeps my life from becoming boring.			0.768		

32. It is more important for me to enjoy life's journey than to focus only on the destination.			0.670		
33. Things rarely work out as I expected.				0.199	
34. It's hard for me to forget unpleasant images of my youth.				0.461	
35. It takes joy out of the process and flow of my activities, if I have to think about goals, outcomes, and products.	0.612				
36. Even when I am enjoying the present, I am drawn back to comparisons with similar past experiences.				0.516	
37. You can't really plan for the future because things change so much.	0.442				
38. My life path is controlled by forces I cannot influence.	0.560				
39. It doesn't make sense to worry about the future, since there is nothing that I can do about it anyway.	0.469				
40. I complete projects on time by making steady progress.		0.712			
41. I find myself tuning out when family members talk about the way things used to be.					-0.283
42. I take risks to put excitement in my life.			0.790		
43. I make lists of things to do.	0.457				
44. I often follow my heart more than my head.			0.269		
45. I am able to resist temptations when I know that there is work to be done.		-0.211			
46. I find myself getting swept up in the excitement of the moment.			0.298		
47. Life today is too complicated; I would prefer the simpler life of the past.	0.183				

48. I prefer friends who are spontaneous rather than predictable.			0.215		
49. I like family rituals and traditions that are regularly repeated.					0.224
50. I think about the bad things that have happened to me in the past.				0.704	
51. I keep working at difficult, uninteresting tasks if they will help me get ahead.		0.236			
52. Spending what I earn on pleasures today is better than saving for tomorrow's security.	0.674				
53. Often luck pays off better than hard work.	-0.359				
54. I think about the good things that I have missed out on in my life.				0.344	
55. I like my close relationships to be passionate.			0.153		
56. There will always be time to catch up on my work.		-0.204			

Table 6: Factor Loadings for the Zimbardo Time Perspective Inventory by Factor					
Questionnaire Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
16. Painful past experiences keep being replayed in my mind.	0.746				
22. I've taken my share of abuse and rejection in the past.	0.165				
25. The past has too many unpleasant memories that I prefer not to think about.	-0.344				
33. Things rarely work out as I expected.	0.199				
34. It's hard for me to forget unpleasant images of my youth.	0.461				
36. Even when I am enjoying the present, I am drawn back to comparisons with similar past experiences.	0.516				
41. I find myself tuning out when family members talk about the way things used to be.	-0.283				
50. I think about the bad things that have happened to me in the past.	0.704				
54. I think about the good things that I have missed out on in my life.	0.344				
1. I believe that getting together with one's friends to party is one of life's important pleasures.		0.276			
31. Taking risks keeps my life from becoming boring.		0.768			
42. I take risks to put excitement in my life.		0.790			
48. I prefer friends who are spontaneous rather than predictable.		0.215			
14. Since whatever will be will be, it doesn't really matter what I do.			0.718		

18. It upsets me to be late for appointments.			-0.102		
37. You can't really plan for the future because things change so much.			0.442		
38. My life path is controlled by forces I cannot influence.			0.560		
39. It doesn't make sense to worry about the future, since there is nothing that I can do about it anyway.			0.469		
8. I do things impulsively.				0.743	
12. When listening to my favorite music, I often lose all track of time.				0.216	
23. I make decisions on the spur of the moment.				0.649	
44. I often follow my heart more than my head.				0.269	
46. I find myself getting swept up in the excitement of the moment.				0.298	
5. My decisions are mostly influenced by people and things around me.					0.271
6. I believe that a person's day should be planned ahead each morning.					0.799
9. If things don't get done on time, I don't worry about it.					0.262
24. I take each day as it is rather than try to plan it out.					0.474
26. It is important to put excitement in my life.					0.254
43. I make lists of things to do.					0.457
51. I keep working at difficult, uninteresting tasks if they will help me get ahead.					0.236

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The Assessment of Time Orientation as a Predictor of Smoking

INTRODUCTION

Studies of predictors for smoking cessation have largely focused on sociodemographic factors and smoking characteristics of participants. Several have found that gender is a predictive measure of success¹. Education² and age³ are other demographic variables that are commonly used to explain greater success in smoking cessation. Studies examining the number of previous quit attempts⁴ and/or the longest duration of previous abstinence^{5, 6, 7} also are common in the literature. Another significant predictor in many studies is level of nicotine dependence^{8, 9}. Some studies have looked at time to first cigarette¹⁰ as an indicator of level of dependence; others have investigated scores from the Fagerstrom Test for Nicotine Dependence^{11, 12}.

Social factors related to smoking behavior also have been studied as predictors of smoking cessation treatment outcome. Collins et al¹³ hypothesize that social influence processes are more important predictors of long-term outcome. A commonly studied significant factor is whether the individual attempting to quit has friends who are smokers^{14, 15}, lives with smokers¹⁶, or is in general proximity to other known smokers^{17, 18}. The relationship between marital status and smoking cessation is variable across studies. Some studies have reported a significant association between being married and smoking cessation^{19, 20} while others have not²¹.

The relationship between psychosocial factors and smoking cessation has also been examined. Among psychosocial factors, time perspective is a promising characteristic that might be associated with both the degree of interest in quitting and in the likelihood of successfully quitting. Some personality factors include the level of risk-taking behavior, sensation seeking, novelty seeking and ADHD. However, many of these studies examine the role of personality factors in the initiation of smoking and are focused on adolescents^{22, 23}. Common measures that are used to examine personality include the Eysenck Personality Questionnaire (extraversion, introversion, neuroticism, lie, psychoticism), Karolinska Scales of Personality (personality traits), Tridimensional Personality Questionnaire (novelty-seeking, harm-avoidance, reward-dependence, sentimentality, persistence), and the Personality Diagnostic Questionnaire (paranoid, antisocial, obsessive-compulsive).

A study by Carton²⁴ evaluated a wide range of possible personality characteristics including emotional disturbances, anxiety, and depressive symptoms as predictors in a smoking cessation intervention. He found that sensation seeking was a positive predictor as have several other studies^{25, 26, 27}. Other studies demonstrated a link between novelty seeking and smoking^{28, 29, 30}. Possessing antisocial and fewer extraverted characteristics were also commonly significant^{31, 32, 33}. However, existing studies on personality factors are limited in the number of subjects enrolled, the types of personality factors that are examined, and in examining the direct role of certain personality factors to a particular quit attempt. A more rigorous examination of individual personality factors is an essential in understanding the predictors that lead to long-term abstinence.

Time is a process that can be influenced by social demographic factors. It can be categorized into past, present and future orientations, and it can be used for encoding, storing, and recalling past events. Present time can be described as an orientation in which a person has tendencies towards self-indulgence, immediate gratification, high-risk

behavior, and avoidance of tasks that involve work, effort, or planning. In contrast, future time is an orientation that is concerned about the avoidance of risk, planning for the future, and the implications of present behavior for the future. Orientations to time are also fundamental for forming expectations, goals, contingencies, and imaginative scenarios³⁴.

Studies have found positive correlation between present time perspective and substance users. People with present time perspective are more likely to report using alcohol, drugs, and tobacco³⁵. Future orientation is inversely related to substance use³⁶. In a study of opiate-injecting drug users, researchers found a present time perspective tended to characterize those who were currently injecting, whereas a future time perspective was more prevalent among those who had ceased opiate injections³⁷.

A few studies have begun to examine the role of time perspective and smoking and found that examining time orientation as a predictor of outcome is a worthwhile endeavor. In a study by Adams³⁸, they examined the role of time perspective in older English adults. They found that being future orientated increased effectiveness of smoking cessation interventions by using a question on financial planning as a proxy measure of time orientation. Two other studies have examined the role of time orientation and smoking^{39, 40}. Jones⁴¹ et al examined whether smokers had a specific orientation and compared future orientation to impulsivity. They hoped to examine whether smokers tended to be less future oriented and impulsive. Adams⁴² examined whether time perspective mediates socioeconomic inequalities in smoking. These studies have begun to acknowledge the importance of time orientation in health behaviors, particularly smoking. Studies that been conducted on time have used proxy measures, focused only on particular domains of time orientation and have used a range of instruments and methods for assessing time orientation. There continues to be a need to examine time orientation directly, to examine the range of time orientation including present, past and future domains, and a need to examine time orientation in the context of an intervention to assess whether it can be a predictive variable for smoking cessation programs.

Previous studies of smoking cessation predictors and outcomes have been limited to demographic, smoking health habits, and some psychosocial factors. Gaining a clearer perspective on the relationship between time orientation and smoking cessation outcome will help us understand if treatment programs are appropriately designed for those who enter such programs.

The proposed study investigated time orientation as a predictor of individuals' successfully completing a smoking cessation treatment program. The aims of this study are to identify the time orientation of patients at entry into a smoking cessation program and to explore the relationship of time orientation to other potential predictors of smoking cessation. Characterizing the time orientation of smokers and its relation with smoking cessation is the first step toward designing future tailored smoking cessation interventions that would better meet the cessation needs of smokers. Because of the substantial health, quality of life and economic benefits of smoking cessation, even later in life, determining if time perspective is a predictor of success could have a potentially large impact on public health. Such a study would be valuable because it would allow for identification of specific attributes of the individuals who are more likely to succeed in a smoking cessation intervention and would allow for tailoring of referrals and for appropriate

modification of smoking cessation programs to make them better matched to individual recipients.

METHODS

Study Setting

Participants for this study were recruited from a larger smoking cessation study, the Quitline study, a primary-care based Telephone Care Coordination Program (TCCP) for smoking cessation throughout the VA Sierra Pacific Healthcare Network. The goals of the Quitline study were to implement a system to increase referrals to a state Quitline in a more efficient manner and to promote long-term abstinence from smoking.

Participants for this study were recruited from the Northern California division. All participants were referred from their primary care physician into the telephone-based smoking cessation intervention and were given brief smoking cessation counseling from their provider and smoking cessation medications.

Participants

Participants in the study are men and women over the age of eighteen who are seen in clinics throughout the VA Sierra Pacific Healthcare Network. We enrolled 150 participants through the Quitline Study. When patients were contacted by the care coordinators for the Quitline Study, they were asked if they would agree to be contacted to review eligibility for a research study examining predictors of smoking cessation outcome. Telephone Care Coordinators maintained a list of names and phone numbers of interested participants. Research staff obtained the list and contacted interested patients daily. The research assistant contacted the prospective participant by phone and asked for verbal consent and an interview time was scheduled for the baseline intake before the quit date. The telephone interview lasted approximately forty-five minutes.

This study assessed time perspective as a predictor of outcome in an ongoing intervention study examining the telephone-based smoking cessation care. We administered a survey before their scheduled quit date, at four weeks and six months after their quit date.

Survey methodology

Study participants received all treatment as defined by the intervention as part of the Quitline Study. Upon enrolling in this study, they completed a questionnaire before their quit date that assessed their baseline time orientation and other characteristics. The research interviewer contacted the subjects by telephone again at four weeks and six months after the quit date.

Measures

The survey took approximately forty-five minutes to complete and included questions on smoking characteristics including patients' level of dependence, current smoking status, age at which first smoked and previous relapse history as well as socioeconomic information related to income, education and employment. Patients completed items assessing perceived stress, social support and time perspective. Each of the scales administered at baseline is described below:

Perceived Stress Scale

The Perceived Stress Scale (PSS) was developed to measure perceptions of stress. In addition to directly measuring levels of current stress, the scale was designed to provide information on how unpredictable and uncontrollable events can be and the influence of such events on stress. All scores were obtained by summing the 5-point Likert scale responses across the 10-items. Four items (items 4, 5, 7, and 8) were written negatively and were reverse-coded prior to summing across the ten total items. The mean score among men was 12.1 and 13.7 among women and was consistent across racial groups and had an alpha coefficient of 0.78⁴³. The mean scores on the Perceived Stress Scale were the highest amongst the 18-29 age group and the lowest among the 55-64 age group⁴⁴. Using the 5-point Likert scale ranging from never (0) to very often (4) participants were asked to indicate how often they felt or thought about each item during the last month.

Multidimensional Scale of Perceived Social Support

The Multidimensional Scale of Perceived Social Support was used to assess perceived social support. Three factors (family, friends and significant others) were primarily used to contextualize perceptions of social support. This 12-item self-report measure used a 7-point Likert scale ranging from very strongly disagree (1) to very strongly agree (7). Items that focused on family asked about communication with family and extent of emotional support received and items on support from friends assessed the degree to which a person can count on a friend and whether friends are there to help.

Scores for the Multidimensional Scale of Perceived Social Support were summed across all items to give a total score and also summed to give scores for social support related specifically to family, friends and significant others. A higher score indicated a greater level of social support. Authors reported a coefficient alpha of 0.91 for the significant other domain, 0.87 for family domain and 0.85 for the friend domain. They obtained a coefficient alpha of 0.88 for the scale in entirety and strong test-retest reliability (0.85) and construct reliability for the scale⁴⁵.

Psychometric properties of the scale have been shown to be valid and reliable in younger adults^{46, 47} and in older adults⁴⁸. Stanley⁴⁹ examined the use of the scale among an elderly population with psychiatric disorders and found similar psychometric properties including a three factor solution.

Zimbardo Time Perspective Inventory

The Zimbardo Time Perspective Inventory measures an individual's beliefs, preferences, and values regarding temporary experiences and takes motivational, emotional, cognitive and social aspects into account. It has been used predominantly in examining risky behaviors including alcohol, drug and overall risk perception. Questions are asked in a 5-point Likert format that ranges from 1 to 5 where 1 indicated that the participant found the item to be very uncharacteristic and 5 indicated that the participant found the item very characteristic. Psychometric properties of the scale have shown that the past negative and the future subscales of the Zimbardo Time Perspective Inventory

are distinct from sensation seeking, novelty seeking, depression and reward dependence and conscientiousness^{50, 51}.

Five factors (past negative, past positive, present fatalistic, present hedonistic and future) are primarily used to contextualize perceptions of time orientation. Generally those who are past oriented tend to focus on past experiences and choices. Individuals who are past oriented are uncomfortable with the unfamiliar and are hesitant to change⁵². Zimbardo further divides individuals with a past orientation into either being past negative or past positive. Being past negative in particular means that an individual has a negative perception of one's past experiences. Commonly, this way of thinking can result from either experiencing a traumatic event in the past or reconstructing a past event in a negative way⁵³. Examples of questions asked to assess this domain include, "Painful past experiences keep being replayed in my mind" and "Even when I am enjoying the present, I am drawn back to comparisons with similar past experiences." Being predominantly past positive indicates that you maintain a positive perception of your past. Those who are past positive tend to focus on past experiences but tend to have high self-esteem and are generally happy⁵⁴. Examples of items within this category include "Happy memories of good times spring readily to mind" and "Familiar childhood sights, sounds and smells often bring back a flood of wonderful memories."

Individuals who have a present orientation focus on the issues surrounding them in their current context. They tend to focus on the moment and do not focus on future consequences or refer to the past. These individuals are mostly unable to delay gratification and tend not to plan⁵⁵. Individuals who are present oriented are further classified as either being present fatalistic or present hedonistic. Individuals who are present fatalistic believe that they have no control in their current life or in informing the future. Those with this orientation feel that their individual actions will not have an impact on their current situation or the future. Examples of items within this domain are "You can't really plan for the future because things change so much" and "It takes joy out of the process and flow of my activities, if I have to think about goals, outcomes, and products." Individuals who are present hedonistic tend to live in the moment and focus on issues related to their immediate situations and surroundings. Those with this orientation tend not to be motivated by rewards or believe that one can learn from the past. They make decisions that focus on immediate consequences and do not value how their present actions may lead to negative future consequences⁵⁶. Examples of questions within this domain include "It is more important for me to enjoy life's journey than to focus only on the destination" and "I try to live my life as fully as possible, one day at a time."

Individuals who are future oriented are focused on the future and are able to delay gratification for future goals. They also tend to make decisions and take actions that will benefit them for the future⁵⁷. Because they are concerned with the future outcomes of their present behavior, they plan more and are less inclined to take physical risks⁵⁸. They monitor their present behavior to attain the necessary future outcomes⁵⁹. Examples of this category include "I keep working at difficult uninteresting work if it will help me get ahead" and "When I want to achieve something, I set goals and consider specific means for reaching those goals."

Zimbardo reported an overall Cronbach's alpha of the scale at .82 and found that the total variance explained by the sum of the five domains was 36%. Test-retest

reliabilities were conducted among undergraduate students after a period of 4 weeks with the highest reliability for the future subscale (0.8), 0.76 for both present fatalistic and past positive subscales, 0.72 for present hedonistic and 0.7 for the past negative. Zimbardo also assessed validity by conducting convergent and discriminant validity with the Buss and Perry Aggression Questionnaire, Beck Depression Inventory, Conscientiousness scale, Strathman Consideration of Future Consequences Scale, Ego-Control Subscale, Impulse Control Subscale, and the Novelty Seeking subscale from the Tridimensional Personality Questionnaire.

Income & Employment

All participants were asked to report their income and employment status. Participants were asked “What is your annual household income from all sources?” Answer choices included less than \$10,000; less than \$15,000(\$10,000 to less than \$15,000); less than \$20,000 (\$15,000 to less than \$20,000); less than \$25,000(\$20,000 to less than \$25,000); less than \$35,000(\$25,000 to less than \$35,000); less than \$50,000(\$35,000 to less than \$50,000); less than \$75,000(\$50,000 to less than \$75,000); and \$75,000 or more. These categories were re-coded to 1 if income was between 0 and \$34,000; 2 if income between \$35,000 and \$49,000; 3 if income between \$50,000 and \$74,000 and 4 if income was reported as being at or above \$75,000.

To assess employment, participants were asked “Which of the following best describes your current employment status?” Employed full-time (more than 35 hours a week), employed part-time (less than 35 hours a week), retired, volunteer, student, unemployed or disabled. These categories were combined into five categories overall: employed part-time or full-time (re-coded as 1), retired (re-coded as 2), unemployed (re-coded as 3), disabled (re-coded as 4) and other (re-coded as 5).

Education

All participants were asked about level of education at baseline. Participants were asked “What was the highest grade or year of regular school or college that you completed?” Participants could pick from indicating that they had no formal school (coded as 1), had elementary or junior high school level education (years 1-8) (coded as 2), high school (years 9-12), post secondary school (coded as 4), some college (coded as 5), bachelors degree (coded as 6), bachelors degree and some graduate school (coded as 7) or masters degree, doctorate degree or higher (coded as 8). These categories of education were re-coded to high school education or less (re-coded as 1), post secondary or some college (re-coded as 2), bachelors degree (re-coded as 3) and some graduate level work (re-coded as 4).

Smoking Status

At baseline participants were a series of questions regarding current and past smoking characteristics. Participants were asked how many cigarettes they were smoking each day and how many days per week they smoked. To assess smoking at baseline, participants were asked, “How many cigarettes per day do you smoke?” and “How many days per week do you smoke?” In regression analyses, number of cigarettes smoked was used a continuous variable.

Statistical plan

Regression analyses were used to assess our aims. Linear regression was for outcomes on a continuous scale. We also utilized one way-ANOVA calculations to assess how time orientation varied across predictors. In particular, we were interested in exploring how the Zimbardo Time Perspective Inventory varied across socioeconomic factors. We explored outcomes by item of the Zimbardo Time Perspective Inventory the by each of the domains. We were examining whether a single item of the Zimbardo Time Perspective Inventory would prove to be more predictive than a domain of the scale. Having a single item that could be used to screen participants in health care settings would alleviate the time necessary to classify an individual by time orientation and allow for tailoring of health interventions to match individual to treatment.

Data Management and Quality Assurance

IBM-compatible computers were be used to store and track the data. Research interviewers underwent training and evaluation prior to initiation of data collection. Questionnaires were piloted, both for ease of administration and accuracy of coding. All data were double-entered and range and logic checks were used during data entry. The study investigators met weekly with project staff to oversee data collection procedures and resolve questions. An operations manual with detailed instructions regarding data collection was devised prior to initiation of data collection and revised as needed during the study.

RESULTS

Patient Characteristics

A strength of this study is the inclusion of participants from a range of socioeconomic levels. In fact, about half (47%) of the participants had attended college, while 30% of the participants had completed high school. Almost half (45%) of the participants had annual incomes below \$34,000. In addition, about 37% of the participants worked part or full-time, 26% were retired, and 28% were disabled. The majority (95%) of the participants in this study were men who agreed to enroll in a smoking cessation intervention.

Smoking characteristics and Time Orientation

Participants in this started smoking at an early age and have been smokers for the majority of their adult lives. Most of the participants started smoking between the ages of eleven and nineteen (74%). In addition, most of the participants (89%) have been smoking for over 20 years. Participants were predominantly daily smokers (96%) and over half of the participants smoked one pack or more a day.

Characteristics of Time Orientation Scale

Mean scores for each of the domains ranged from 2.67 (Present Fatalistic) to 3.55 (Future). The mean scores for present hedonistic (3.24), past negative (3.27), and past positive (3.33) fell in between. For each of the domains, participants used the full

range of response from 1 (very uncharacteristic) to 5 (very characteristic). Each of the domains was largely normally distributed (see Figures 1-5) and domain-domain correlations were 0.41 (future-past positive), -0.51(future-present fatalistic), -0.1(future-past negative), -0.1(future-present hedonistic), -0.25 (past positive-present fatalistic), -0.28 (past positive-past negative), -0.01 (past positive-present hedonistic), 0.61 (present fatalistic-past negative), 0.41 (present fatalistic-present hedonistic), and 0.43 (past negative-present hedonistic). See Table 1 for correlations between each of the domains. In addition, participants showed a range of time orientation at baseline. Participants ranged from being future oriented (37%) to present fatalistic (7%). Present hedonistic (8%), past negative (21%) and past positive (23%) fell in between. Combining the five domains into the three domains gives us 20% of participants being present oriented, 44% being past oriented and 36% being future oriented at baseline.

Table 1: Correlations among five domains of the Zimbardo Time Perspective Inventory

	Future	Past Positive	Present Fatalistic	Past Negative	Present Hedonistic
Future	1.000				
Past Positive	0.414	1.000			
Present Fatalistic	-0.509	-0.253	1.000		
Past Negative	-0.092	-0.278	0.608	1.000	
Present Hedonistic	-0.108	-0.011	0.405	0.428	1.000

Linear Regression

We utilized linear regression models describing the associations between each of the individual z items (Z1-Z56) and number of cigarettes smoked at baseline. Three items including Z4 (p-value = 0.05), Z26 (p-value = 0.04) and Z47 (p-value =0.05) had p-values of at or below 0.05. Table 2 lists each item and corresponding coefficient, p-value and bonferroni adjusted p-value.

In addition, we examined each of the domains separately with smoking and subsequently ran the model with all five domains. There was a significant relationship between being “present hedonistic” and number of cigarettes smoked at baseline. Table 3 summarizes the linear regression models describing the associations between each of the five domains separately and number of cigarettes smoked at baseline. A comparison of the regression coefficients for the relationship between each of the domains and cigarettes smoked is given.

Table 2: Regression Analyses for each Item, Ranked by p-value

Z-item	Coefficient	p-value	Bonferroni adjusted p-value
Z26	-1.671	0.044	2.464

Z47	1.425	0.050	2.800
Z4	1.480	0.053	2.968
Z34	1.370	0.056	3.136
Z43	-1.801	0.061	3.416
Z32	-2.770	0.063	3.528
Z30	-1.133	0.136	7.616
Z27	1.029	0.144	8.064
Z25	-1.093	0.147	8.232
Z17	-2.093	0.154	8.624
Z42	-1.068	0.170	9.520
Z31	-1.337	0.191	10.696
Z23	0.970	0.192	10.752
Z35	1.074	0.217	12.152
Z6	-1.203	0.231	12.936
Z3	-0.855	0.236	13.216
Z52	1.146	0.246	13.776
Z37	0.835	0.260	14.560
Z38	0.864	0.260	14.560
Z41	0.852	0.267	14.952
Z56	0.854	0.273	15.288
Z39	-1.007	0.284	15.904
Z2	-1.024	0.292	16.352
Z19	-1.221	0.293	16.408
Z9	-0.740	0.318	17.808
Z10	-0.717	0.331	18.536
Z28	-0.753	0.358	20.048
Z53	1.302	0.369	20.664
Z21	1.100	0.402	22.512
Z45	-0.690	0.419	23.464
Z36	-0.622	0.433	24.248
Z44	0.719	0.456	25.536
Z54	-0.742	0.457	25.592
Z16	0.500	0.470	26.320
Z20	-0.556	0.518	29.008
Z40	-0.683	0.553	30.968
Z8	0.416	0.562	31.472
Z22	0.624	0.567	31.752
Z12	0.416	0.604	33.824
Z7	-0.393	0.617	34.552
Z13	0.456	0.636	35.616
Z51	0.396	0.636	35.616
Z49	0.358	0.652	36.512
Z11	-0.447	0.665	37.240
Z33	0.308	0.719	40.264
Z14	0.262	0.749	41.944

Z15	-0.252	0.754	42.224
Z55	0.309	0.765	42.840
Z50	-0.267	0.768	43.008
Z46	0.216	0.787	44.072
Z29	0.208	0.788	44.128
Z1	0.189	0.812	45.472
Z5	-0.214	0.812	45.472
Z48	-0.247	0.814	45.584
Z24	-0.107	0.902	50.512
Z18	-0.082	0.947	53.032

Table 3: Regression Analyses with all Five Domains in One Model

Domain	Baseline coefficient	Standard Error	Standard Coefficient	p-value
Present Fatalistic	1.450	1.150	1.668	0.209
Present Hedonistic	-1.950	1.487	-2.900	0.192
Future	-1.791	1.663	-2.978	0.283
Past Positive	-0.782	1.370	-1.071	0.569
Past Negative	1.029	1.425	1.466	0.471

ANOVA

The mean and standard deviation of three socioeconomic factors (education, income and employment) and five subscale scores are presented in Tables 4-6. In one-way ANOVA analysis, we found that time orientation was related to several socioeconomic status variables. Individuals high in future orientation were more likely to have completed some graduate school and to earn more than \$78,000 per year. In contrast, those high in present fatalistic orientation were least likely to have completed any graduate school and to have earned more than \$78,000 per year. Similarly, those who were present fatalistic were least likely to be employed part or full-time.

Table 4: One-way ANOVA of Education Level and Domains of Time Orientation

Education Level		Past Positive	Past Negative	Future	Present Fatalistic	Present Hedonistic
High School	M	3.248	3.407	3.358	2.928	3.349
n=150	SD	0.634	0.640	0.562	0.687	0.550
Some College	M	3.311	3.326	3.620	2.657	3.226

n=150	SD	0.672	0.626	0.470	0.693	0.531
Bachelors	M	3.476	3.014	3.516	2.556	3.279
n=150	SD	0.605	0.703	0.564	0.625	0.461
Some Graduate	M	3.486	2.663	3.913	1.792	2.600
n=150	SD	0.922	0.825	0.428	0.354	0.274

Table 5: One-way ANOVA of Income Level and Domains of Time Orientation

Income Level		Past Positive	Past Negative	Future	Present Fatalistic	Present Hedonistic
0 - \$34,000	M	3.315	3.342	3.551	2.736	3.224
n=150	SD	0.586	0.691	0.525	0.737	0.541
\$35,000 - \$49,000	M	3.125	3.269	3.413	2.663	3.221
n=150	SD	0.719	0.564	0.553	0.662	0.521
\$50,000 - \$74,000	M	3.271	3.116	3.563	2.618	3.136
n=150	SD	0.829	0.720	0.535	0.705	0.481
\$75,000 and above	M	3.650	3.235	3.680	2.581	3.377
n=150	SD	0.515	0.711	0.466	0.718	0.597

Table 6: One-way ANOVA of Employment and Domains of Time Orientation

Employment Level		Past Positive	Past Negative	Future	Present Fatalistic	Present Hedonistic
Employed part-time or full-time	M	3.412	3.082	3.642	2.475	3.207
n=150	SD	0.535	0.657	0.450	0.707	0.571
Retired	M	3.286	3.203	3.381	2.856	3.263
n=150	SD	0.623	0.724	0.576	0.725	0.535
Unemployed	M	3.311	3.750	3.708	2.800	3.147
n=150	SD	0.787	0.499	0.582	0.693	0.691
Disabled	M	3.228	3.460	3.527	2.757	3.273
n=150	SD	0.826	0.593	0.539	0.664	0.482

Other	M	3.667	3.367	3.718	2.333	3.133
n=150	SD	0.509	0.702	0.311	0.577	0.267

DISCUSSION

The analysis of the data reveals that there is a relationship between present time orientation and smoking. Being present oriented is associated with smoking a greater number of cigarettes at baseline in a full model that includes all of the domains. Time orientation is also related to a number of socioeconomic status variables. For instance, in ANOVA analyses, being present orientated is associated with lower levels of education and income. In contrast, those with greater levels of education and income tend to be future oriented.

In studies examining substance use and time orientation, being present oriented was associated with substance including alcohol and drugs. Comparing those who are currently injecting to those who are not currently injecting Alvos⁶⁰ et al. found that a significant and consistent difference between the two groups on their time orientation. Those who were currently injecting had a shortened future time orientation. Alvos hypothesized that participants who were future orientated and in treatment was due to the fact that they were currently in treatment. He believed that the differences in time orientation may not necessarily be related to specific addictive behavior but instead on whether an individual was currently in treatment. Being in treatment, made an individual become more future oriented. This hypothesis was further backed by work done by Breier-Williford⁶¹ who also saw that adult inpatients who had been admitted for chemical dependency were in fact, more future (mean 3.18 SD .68 Range 1.7-5.1) and present-fatalistic (mean 3.18 SD .59 Range 2.0-4.4) oriented than present-hedonistic (mean 3.00 SD .79 Range 1.4-3.0).

Alternatively, individuals who had addictive behaviors but were not in treatment tended not to be future oriented. Smart⁶² found that the future time orientation of alcoholics matched for age, sex, and occupation was less extensive and less coherent than the time orientation of social drinkers. Similarly, Lavelle⁶³ et al. reported that patients in a drug treatment program were less motivated for the future than were controls. More recently, Keough et al⁶⁴ found that future time orientation was negatively related to reported substance use across 2627 student participants from 15 samples.

Being impulsive is also largely to be associated with smoking. In fact, Lipkus⁶⁵ showed that men who were past and current smokers had higher scores on being impulsive, rebellious, hostile, socially extroverted and sensation seeking when compared to non-smokers. The links between impulsivity, sensation seeking, and novelty seeking provide further evidence of possible pathways between being present-oriented and engaging in addictive behaviors, including smoking.

This study also found that factors such as education, income and employment vary by a person's time orientation. Individuals who were future oriented, tended to have higher means as level of education increased and as income levels increased. The reverse was true for those individuals who were present-orientated. Several studies have examined how socioeconomic status influences time orientation and health outcomes^{66, 67, 68, 69}. Although there are several associations between socioeconomic

status and time orientation in the literature the mechanisms by which socioeconomic status impacts time orientation remains unclear.

Conclusion

Our analyses show that being present orientated has an impact on the number of cigarettes smoked at baseline. Our evidence shows that time orientation can be meaningful in understanding who smokes and who may be a heavier smoker. As expected and previously noted in research on drugs and alcohol, being present orientated was found to be related to the number of cigarettes smoked at baseline. However, there continues to be a need to understand how time orientation influences smoking cessation behavior over time. We need to understand whether individuals with differing time orientations have different outcomes during a health intervention. Our findings suggest that longitudinal analyses of the role of time orientation in health behaviors is necessary and needed and will provide information for modifying health interventions keeping time orientation in mind.

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The Longitudinal Analysis of Time Orientation in a Smoking Cessation Intervention

INTRODUCTION

Smoking is a common health problem among patients using the Veterans Health Administration (VA). The prevalence of smoking is higher among VA users than among the general population (33% vs. 23%), as is the number of heavy tobacco users (7.4% vs. 3.5%)¹. Two-thirds of VA patients have an income less than \$20,000/year and 45% have no more than a high school education². Furthermore, patients using the VA for health care have worse physical and mental health than the general population, giving them an even stronger need to quit smoking. Therefore, while these patients all have access to health care, it is a population that clearly needs to increase the use and effectiveness of smoking cessation interventions.

Time is a process that can be influenced by social demographic factors. It can be categorized into past, present and future orientations, and it can be used for encoding, storing, and recalling past events. Present time can be described as an orientation in which a person has tendencies towards self-indulgence, immediate gratification, high-risk behavior, and avoidance of tasks that involve work, effort, or planning. In contrast, future time is an orientation that is concerned about the avoidance of risk, planning for the future, and the implications of present behavior for the future. Orientations to time are also fundamental for forming expectations, goals, contingencies, and imaginative scenarios³.

Studies have found positive correlation between present time perspective and substance users^{4, 5}. People with present time perspective are more likely to report using alcohol, drugs, and tobacco^{6, 7} and to engage in risky behavior⁸. Future orientation is inversely related to substance use⁹. In a study of opiate-injecting drug users, researchers found a present time perspective tended to characterize those who were currently injecting, whereas a future time perspective was more prevalent among those who had ceased opiate injections¹⁰.

There is also research identifying links between time orientation and risky behavior. Keough¹¹ assessed time orientation using the Zimbardo Time Perspective Inventory to indexes of risky driving in adolescent and college-aged students and found that being present oriented was positively related to risk behavior indexes and that being future oriented was inversely related to risk behavior. Rothspan and Read¹² examined time orientation and risky sexual behavior among college student and found that being present oriented was positively related to sex risk behavior and being future oriented was inversely related to some risky behavior.

A few studies have begun to examine the role of time perspective and smoking and found that examining time orientation as a predictor of outcome is a worthwhile endeavor. In a study by Adams¹³, they examined the role of time perspective in older English adults. They found that being future orientated increased effectiveness of smoking cessation interventions by using a question on financial planning as a proxy measure of time orientation. Two other studies have examined the role of time orientation and smoking^{14, 15}. Jones¹⁶ et al examined whether smokers had a specific orientation and compared future orientation to impulsivity. They hoped to examine whether smokers tended to be less future oriented and impulsive. Adams¹⁷ examined

whether time perspective mediates socioeconomic inequalities in smoking. These studies have begun to acknowledge the importance of time orientation in health behaviors, particularly smoking. Studies that been conducted on time have used proxy measures, focused only on particular domains of time orientation and have used a range of instruments and methods for assessing time orientation. There continues to be a need to examine time orientation directly, to examine the range of time orientation including present, past and future domains, and a need to examine time orientation in the context of an intervention to assess whether it can be a predictive variable for smoking cessation programs.

Time perspective may be an important predictor of success in smoking cessation programs. Thus, it is important to better understand the role of time perspective for smoking cessation. More specifically, there needs to a greater understanding of the role that time perspective plays in initiating a quit attempt and in the success of that quit attempt. We hope the information generated from this study will allow us to better understand the role of time perspective and behavior change and to make recommendations for improving smoking cessation treatment programs. Gaining a clearer perspective on the relationship between time orientation and smoking cessation outcome will help us understand if treatment programs are appropriately designed for those who enter such programs.

The proposed study investigated time orientation as a predictor of individuals' successfully completing a smoking cessation treatment program. The aims of this study are to identify the time orientation of patients at entry into a smoking cessation program and to explore the relationship of time orientation to smoking cessation in an on-going intervention.

Characterizing the time orientation of smokers and its relation with smoking cessation is the first step toward designing future tailored smoking cessation interventions that would better meet the cessation needs of smokers. Because of the substantial health, quality of life and economic benefits of smoking cessation, even later in life, determining if time perspective is a predictor of success could have a potentially large impact on public health. Such a study would be valuable because it would allow for identification of specific attributes of the individuals who are more likely to succeed in a smoking cessation intervention and would allow for tailoring of referrals and for appropriate modification of smoking cessation programs to make them better matched to individual recipients.

METHODS

Study Setting

Participants for this study were recruited from a larger smoking cessation study, the Quitline study, a primary-care based Telephone Care Coordination Program (TCCP) for smoking cessation throughout the VA Sierra Pacific Healthcare Network. The goals of the Quitline study were to implement a system to increase referrals to a state Quitline in a more efficient manner and to promote long-term abstinence from smoking. Participants for this study were recruited from the Northern California division. All participants were referred from their primary care physician into the telephone-based

smoking cessation intervention and were given brief smoking cessation counseling from their provider and smoking cessation medications.

Participants

Participants in the study were men and women over the age of eighteen who were seen in clinics throughout the VA Sierra Pacific Healthcare Network. We enrolled 150 participants through the Quitline Study. When patients were contacted by the care coordinators for the Quitline Study, they were asked if they would agree to be contacted to review eligibility for a research study examining predictors of smoking cessation outcome. Telephone Care Coordinators maintained a list of names and phone numbers of interested participants. Research staff obtained the list and contacted interested patients daily. The research assistant contacted the prospective participant by phone and asked for verbal consent and an interview time was scheduled for the baseline intake before the quit date. The initial telephone interview lasted approximately forty-five minutes and the two subsequent telephone interviews at four weeks and six months lasted thirty minutes each. This study assessed time perspective as a predictor of outcome in an ongoing intervention study examining the telephone-based smoking cessation care. We administered a survey before their scheduled quit date, at four weeks and six months after their quit date.

Survey methodology

Study participants received all treatment as defined by the intervention as part of the Quitline Study. Upon enrolling in this study, they completed a questionnaire before their quit date that assessed their baseline time orientation and other characteristics. The research interviewer contacted the subjects by telephone again at four weeks and six months after the quit date.

Measures

At each of the three time points, the survey took approximately 30-45 minutes to complete. At the baseline assessment participants were asked questions on smoking characteristics including patients' level of dependence, current smoking status, age at which first smoked and previous relapse history. In addition to socioeconomic questions, patients also completed items assessing perceived stress, social support and time perspective. At four weeks and again at the six month follow-up time orientation was reassessed. Questions related to smoking, relapse and reason for relapse were also asked at four weeks and at six months.

Perceived Stress Scale

The Perceived Stress Scale (PSS) was developed to measure perceptions of stress. In addition to directly measuring levels of current stress, the scale was designed to provide information on how unpredictable and uncontrollable events can be and the influence of such events on stress. All scores were obtained by summing the 5-point Likert scale responses across the 10-items. Four items (items 4, 5, 7, and 8) were written negatively and were reverse-coded prior to summing across the ten total items. The mean score among men was 12.1 and 13.7 among women and was consistent across racial groups and had an alpha coefficient of 0.78¹⁸. The mean scores on the Perceived Stress

Scale were the highest amongst the 18-29 age group and the lowest among the 55-64 age group¹⁹. Using the 5-point Likert scale ranging from never (0) to very often (4) participants were asked to indicate how often they felt or thought about each item during the last month.

Multidimensional Scale of Perceived Social Support

The Multidimensional Scale of Perceived Social Support was used to assess perceived social support. Three factors (family, friends and significant others) were primarily used to contextualize perceptions of social support. This 12-item self-report measure used a 7-point Likert scale ranging from very strongly disagree (1) to very strongly agree (7). Items that focused on family asked about communication with family and extent of emotional support received and items on support from friends assessed the degree to which a person can count on a friend and whether friends are there to help.

Scores for the Multidimensional Scale of Perceived Social Support were summed across all items to give a total score and also summed to give scores for social support related specifically to family, friends and significant others. A higher score indicated a greater level of social support. Authors reported a coefficient alpha of 0.91 for the significant other domain, 0.87 for family domain and 0.85 for the friend domain. They obtained a coefficient alpha of 0.88 for the scale in entirety and strong test-retest reliability (0.85) and construct reliability for the scale²⁰.

Psychometric properties of the scale have been shown to be valid and reliable in younger adults^{21, 22} and in older adults²³. Stanley²⁴ examined the use of the scale among an elderly population with psychiatric disorders and found similar psychometric properties including a three factor solution.

Zimbardo Time Perspective Inventory

The Zimbardo Time Perspective Inventory measures an individual's beliefs, preferences, and values regarding temporary experiences and takes motivational, emotional, cognitive and social aspects into account. It has been used predominantly in examining risky behaviors including alcohol, drug and overall risk perception. Questions are asked in a 5-point Likert format that ranges from 1 to 5 where 1 indicated that the participant found the item to be very uncharacteristic and 5 indicated that the participant found the item very characteristic. Psychometric properties of the scale have shown that the past negative and the future subscales of the Zimbardo Time Perspective Inventory are distinct from sensation seeking, novelty seeking, depression and reward dependence and conscientiousness^{25, 26}.

Five factors (past negative, past positive, present fatalistic, present hedonistic and future) are primarily used to contextualize perceptions of time orientation. Generally those who are past oriented tend to focus on past experiences and choices. Individuals who are past oriented are uncomfortable with the unfamiliar and are hesitant to change²⁷. Zimbardo further divides individuals with a past orientation into either being past negative or past positive. Being past negative in particular means that an individual has a negative perception of one's past experiences. Commonly, this way of thinking can result from either experiencing a traumatic event in the past or reconstructing a past event in a negative way²⁸. Examples of questions asked to assess this domain include, "Painful past experiences keep being replayed in my mind" and "Even when I am enjoying the present, I am drawn back to comparisons with similar past experiences." Being predominantly past positive indicates that you maintain a positive perception of your

past. Those who are past positive tend to focus on past experiences but tend to have high self-esteem and are generally happy²⁹. Examples of items within this category include “Happy memories of good times spring readily to mind” and “Familiar childhood sights, sounds and smells often bring back a flood of wonderful memories.”

Individuals who have a present orientation focus on the issues surrounding them in their current context. They tend to focus on the moment and do not focus on future consequences or refer to the past. These individuals are mostly unable to delay gratification and tend not to plan³⁰. Individuals who are present oriented are further classified as either being present fatalistic or present hedonistic. Individuals who are present fatalistic believe that they have no control in their current life or in informing the future. Those with this orientation feel that their individual actions will not have an impact on their current situation or the future. Examples of items within this domain are “You can’t really plan for the future because things change so much” and “It takes joy out of the process and flow of my activities, if I have to think about goals, outcomes, and products.” Individuals who are present hedonistic tend to live in the moment and focus on issues related to their immediate situations and surroundings. Those with this orientation tend not to be motivated by rewards or believe that one can learn from the past. They make decisions that focus on immediate consequences and do not value how their present actions may lead to negative future consequences³¹. Examples of questions within this domain include “It is more important for me to enjoy life’s journey than to focus only on the destination” and “I try to live my life as fully as possible, one day at a time.”

Individuals who are future oriented are focused on the future and are able to delay gratification for future goals. They also tend to make decisions and take actions that will benefit them for the future³². Because they are concerned with the future outcomes of their present behavior, they plan more and are less inclined to take physical risks³³. They monitor their present behavior to attain the necessary future outcomes³⁴. Examples of this category include “I keep working at difficult uninteresting work if it will help me get ahead” and “When I want to achieve something, I set goals and consider specific means for reaching those goals.”

Zimbardo reported an overall Cronbach’s alpha of the scale at .82 and found that the total variance explained by the sum of the five domains was 36%. Test-retest reliabilities were conducted among undergraduate students after a period of 4 weeks with the highest reliability for the future subscale (0.8), 0.76 for both present fatalistic and past positive subscales, 0.72 for present hedonistic and 0.7 for the past negative. Zimbardo also assessed validity by conducting convergent and discriminant validity with the Buss and Perry Aggression Questionnaire, Beck Depression Inventory, Conscientiousness scale, Strathman Consideration of Future Consequences Scale, Ego-Control Subscale, Impulse Control Subscale, and the Novelty Seeking subscale from the Tridimensional Personality Questionnaire.

Income & Employment

All participants were asked to report their income and employment status. Participants were asked “What is your annual household income from all sources?” Answer choices included less than \$10,000; less than \$15,000(\$10,000 to less than \$15,000); less than \$20,000 (\$15,000 to less than \$20,000); less than \$25,000(\$20,000 to

less than \$25,000); less than \$35,000(\$25,000 to less than \$35,000); less than \$50,000(\$35,000 to less than \$50,000); less than \$75,000(\$50,000 to less than \$75,000); and \$75,000 or more. These categories were re-coded to 1 if income was between 0 and \$34,000; 2 if income between \$35,000 and \$49,000; 3 if income between \$50,000 and \$74,000 and 4 if income was reported as being at or above \$75,000.

To assess employment, participants were asked “Which of the following best describes your current employment status?” Employed full-time (more than 35 hours a week), employed part-time (less than 35 hours a week), retired, volunteer, student, unemployed or disabled. These categories were combined into five categories overall: employed part-time or full-time (re-coded as 1), retired (re-coded as 2), unemployed (re-coded as 3), disabled (re-coded as 4) and other (re-coded as 5).

Education

All participants were asked about level of education at baseline. Participants were asked “What was the highest grade or year of regular school or college that you completed?” Participants could pick from indicating that they had no formal school (coded as 1), had elementary or junior high school level education (years 1-8) (coded as 2), high school (years 9-12), post secondary school (coded as 4), some college (coded as 5), bachelors degree (coded as 6), bachelors degree and some graduate school (coded as 7) or masters degree, doctorate degree or higher (coded as 8). These categories of education were re-coded to high school education or less (re-coded as 1), post secondary or some college (re-coded as 2), bachelors degree (re-coded as 3) and some graduate level work (re-coded as 4).

Smoking Status

Our primary outcome is long-term abstinence, which was assessed as part of the six-month follow up interview. At baseline participants were a series of questions regarding current and past smoking characteristics. To assess smoking at baseline, participants were asked, “How many cigarettes per day do you smoke?” and “How many days per week do you smoke?” At each follow-up patients were assessed for their by smoking status by asking, “Are you currently smoking cigarettes” and if they said yes, they were asked, “How many days a week do you smoke?” and “How many cigarettes do you smoke per day?” Participants that had quit smoking were asked why they had quit smoking and participants that continued to smoke were asked why they returned to smoking. In longitudinal analyses, the number of cigarettes smoked was used a continuous variable.

Data Management and Quality Assurance

IBM-compatible computers were be used to store and track the data. Research interviewers underwent training and evaluation prior to initiation of data collection. Questionnaires were piloted, both for ease of administration and accuracy of coding. All data were double-entered and range and logic checks were used during data entry. The study investigators met weekly with project staff to oversee data collection procedures and resolve questions. An operations manual with detailed instructions regarding data collection was devised prior to initiation of data collection and revised as needed during the study.

Statistical plan

We examined associations between change for each individual item from 1-56 of the Zimbardo Time Perspective Inventory and number of cigarettes smoked from baseline to six months later. We also assessed change for each of the five domains, present fatalistic, present hedonistic, future, past negative and past positive and number of cigarettes smoked from baseline to follow-up.

We used generalized estimating equations to account for correlated data of repeated measurements within one subject and to examine whether number of cigarettes smoked was associated with changes in values for each individual z-item. We assessed the mean change in the number of cigarettes for a one unit increase in the Z-item. In addition, we examined changes in scores for each of the five domains of the Zimbardo Time Perspective Inventory. The single regression coefficient (β) from GEE analysis represents the population average difference in the number of cigarettes over time and takes both between-subject and within-subject correlations into account. We first ran univariate GEE models with each of our predictor items and our outcome variable. We ran univariate analyses for each of the five domains as well.

RESULTS:

At baseline, participants who enrolled in the study had attended college for some time (47%), were high school educated (30%), or had a bachelor's degree (14%). About one third of the participants were currently working (37%), about one-third were retired (26%) and about one-third were disabled (28%). Table 1 shows demographic data on participants at the beginning of the intervention.

Table 1: Demographic Characteristics of Study Sample at Baseline (n=150)

Gender		Number (%)
	Male	143 (95)
	Female	7 (5)
Total		100
Education		
	High School or less	43 (30)
	Post secondary	7 (4)
	Some college	71 (47)
	Bachelor's degree	21 (14)
	Some graduate	8 (5)
Total		100
Employment		
	Employed part or full-time	55 (37)
	Retired	40 (26)
	Unemployed	10 (7)
	Disabled	42 (28)

	Other	3 (2)
Total		100
Income		
	0-34,000	67 (45)
	35,000-49,000	32 (21)
	50,000-74,000	25 (17)
	75,000 & above	19 (12)
	Other	7 (5)
Total		100

The mean age at which participants first started to smoke cigarettes was 17 years old (SE 0.23). Participants had smoked for a mean of 36 years (SE 0.61) and smoked on average 18 cigarettes per day (SE 1.02) at baseline. Table 2 shows smoking characteristics of the participants at baseline.

Table 2: Smoking Characteristics of the Study Sample at Baseline (n=150)

Age first smoked		
	0-10	6 (4)
	11-19	111 (74)
	20-29	27 (18)
	30 & above	6 (4)
Total		100
Years smoked		
	0-10	8 (5)
	11-19	9 (6)
	20-29	24 (16)
	30 & above	109 (73)
Total		100
Cigarettes smoked per day		
	0-10	56 (37)
	11-19	15 (10)
	20-29	53 (36)
	30 & above	26 (17)
Total		100
Days per week smoke		
	Once a week	2 (1)
	Daily	143 (96)
	Other	5 (3)
Total		100

Over the 6-month intervention trial, 134 of the 150 number of participants were retained at four weeks and 115 number of participants remained part of the study at six months. Figures 1-3 show the average scores of time orientation across the three time points. At baseline, 37% of participants were future oriented. Scores for future orientation increased to 45% of the participants being future oriented at four weeks and to 52% percent of the participants being future oriented at six months. Scores for present orientation decreased over the intervention. At baseline 7% of the participants were present fatalistic and 8% were present hedonistic. The percent of participants being present fatalistic decreased to 4% at four weeks and to 2% at the six month follow-up. The percent of participants being present hedonistic remained the same at the four week follow-up (8%) and decreased to 7% at the six-month follow-up. The number of participants who were past negative (21%, 19%, 20%) or past positive (23%, 24%, 18%) remained fairly the same across the three time points. Combining the five domains into the three domains gives us 20% of participants being present oriented, 44% being past oriented and 36% being future oriented at baseline. At the six month follow-up, 9% were present-oriented, 39% were past oriented and 52% were future oriented.

Figure 1: Average scores for Present Orientation at baseline, 4-week and 6-month follow-up

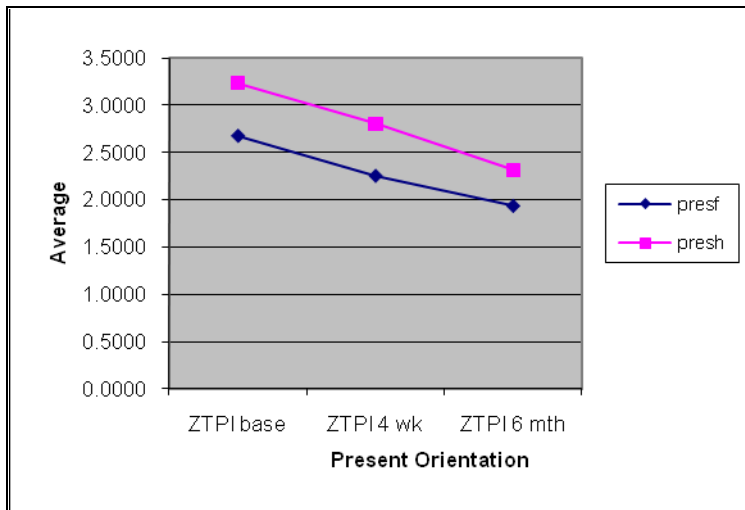


Figure 2: Average scores for Future Orientation at baseline, 4-week and 6-month follow-up

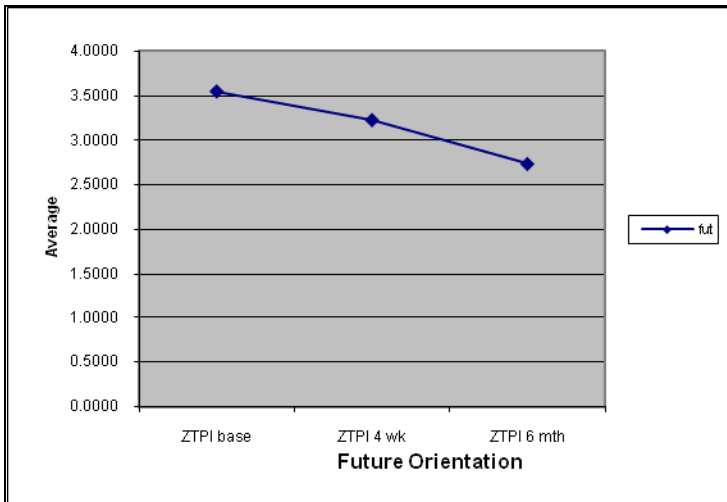


Figure 3: Average scores for Past Orientation at baseline, 4-week and 6-month follow-up

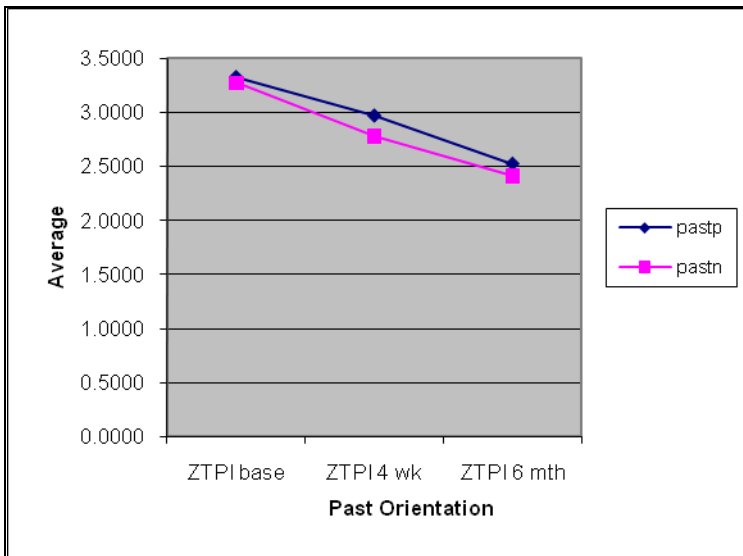


Table 3 shows a summary of the GEE results examining the cross-sectional effects of each of 56 items from the Zimbardo Time Perspective Inventory over time in longitudinal model. The items that had a significant raw p-value ($p < 0.05$) were items Z47, Z43, Z4, Z26, and item Z34. However, after conducting a bonferroni adjustment, none of the individual items were significant. Table 4 shows the longitudinal effects for each of individual items over time. In contrast, to the cross sectional effects, there are a fewer number of predictive individual items. Only items Z4, Z15, Z36, and Z55 had significant unadjusted p-values. Similarly, once we adjusted the p-values, no items remained significant at $p < 0.05$.

Table 3: Baseline Zimbardo Time Perspective Inventory Results by Item

Z-item	Baseline Coefficient	p-value	Bonferroni-adjusted p-value
Z47	1.4856	0.0250	1.0000
Z43	-1.6384	0.0400	1.0000
Z4	1.4023	0.0440	1.0000
Z26	-1.5968	0.0460	1.0000
Z34	1.3411	0.0460	1.0000
Z27	1.2886	0.0590	1.0000
Z38	1.1268	0.1080	1.0000
Z23	1.1028	0.1090	1.0000
Z52	1.2175	0.1640	1.0000
Z32	-1.6050	0.1710	1.0000
Z35	1.1062	0.1760	1.0000
Z17	-1.4691	0.1800	1.0000
Z30	-0.9086	0.2100	1.0000
Z37	0.8465	0.2190	1.0000
Z2	-1.0189	0.2330	1.0000
Z6	-1.0417	0.2440	1.0000
Z25	-0.7841	0.2600	1.0000
Z21	1.2355	0.2760	1.0000
Z39	-0.8405	0.2780	1.0000
Z10	-0.7621	0.2910	1.0000
Z16	0.6197	0.2920	1.0000
Z31	-0.8567	0.3170	1.0000
Z44	0.7693	0.3440	1.0000
Z3	-0.5751	0.3750	1.0000
Z11	-0.7465	0.3830	1.0000
Z7	-0.5571	0.4000	1.0000
Z42	-0.5591	0.4070	1.0000
Z9	-0.5598	0.4100	1.0000
Z53	0.8997	0.4530	1.0000
Z41	0.4898	0.4720	1.0000
Z1	0.5075	0.4830	1.0000
Z20	-0.5155	0.5160	1.0000
Z22	0.6085	0.5170	1.0000
Z19	-0.5904	0.5370	1.0000
Z49	0.4125	0.5480	1.0000

Z8	0.3719	0.5540	1.0000
Z40	-0.5931	0.5570	1.0000
Z14	0.3805	0.5680	1.0000
Z24	-0.3841	0.5960	1.0000
Z54	-0.4467	0.6000	1.0000
Z12	0.3471	0.6340	1.0000
Z28	-0.3486	0.6500	1.0000
Z56	0.3012	0.6600	1.0000
Z5	0.1800	0.8140	1.0000
Z15	0.1517	0.8350	1.0000
Z29	0.1383	0.8430	1.0000
Z45	-0.1418	0.8560	1.0000
Z48	0.1580	0.8570	1.0000
Z33	-0.1000	0.8970	1.0000
Z51	-0.1018	0.8980	1.0000
Z50	0.0946	0.9090	1.0000
Z46	0.0556	0.9380	1.0000
Z36	-0.0387	0.9540	1.0000
Z55	0.0426	0.9620	1.0000
Z18	-0.0428	0.9690	1.0000
Z13	-0.0267	0.9730	1.0000

Table 4: Longitudinal Zimbardo Time Perspective Inventory Results by Item

Z-item	Longitudinal Coefficient	p-value	Bonferroni-adjusted p-value
Z4	2.3833	0.0010	0.0560
Z55	2.6010	0.0070	0.3920
Z36	1.9815	0.0220	1.0000
Z15	1.9934	0.0240	1.0000
Z17	-2.5581	0.0980	1.0000
Z18	1.2327	0.1280	1.0000
Z37	1.2107	0.1540	1.0000
Z23	1.2365	0.1580	1.0000
Z21	2.2758	0.1590	1.0000
Z40	1.6012	0.2180	1.0000
Z47	-0.9987	0.2240	1.0000
Z43	-1.2708	0.2270	1.0000
Z9	-0.8136	0.2350	1.0000
Z28	1.1005	0.2560	1.0000
Z8	0.9358	0.2730	1.0000
Z45	0.9200	0.2730	1.0000

Z10	-1.5479	0.2770	1.0000
Z22	1.1874	0.3210	1.0000
Z20	-0.8205	0.3230	1.0000
Z49	1.0292	0.3370	1.0000
Z52	0.9129	0.3490	1.0000
Z13	-0.9525	0.3540	1.0000
Z19	-0.7034	0.3580	1.0000
Z44	0.8221	0.3900	1.0000
Z54	-0.8347	0.3910	1.0000
Z48	1.0844	0.3940	1.0000
Z6	-0.7730	0.4500	1.0000
Z35	0.8065	0.4550	1.0000
Z33	-0.6244	0.4570	1.0000
Z56	0.6138	0.4700	1.0000
Z5	0.5668	0.4770	1.0000
Z16	-0.5409	0.4830	1.0000
Z41	-0.6091	0.4910	1.0000
Z24	-0.6012	0.5000	1.0000
Z42	-0.6170	0.5080	1.0000
Z30	-0.5965	0.5110	1.0000
Z32	-0.7153	0.5110	1.0000
Z46	-0.5989	0.5300	1.0000
Z26	-0.5509	0.5700	1.0000
Z31	-0.6008	0.5830	1.0000
Z27	0.4229	0.6400	1.0000
Z11	-0.4385	0.6480	1.0000
Z53	0.4934	0.6790	1.0000
Z14	0.3142	0.6820	1.0000
Z1	-0.2642	0.7090	1.0000
Z34	0.3170	0.7130	1.0000
Z7	-0.3326	0.7540	1.0000
Z12	-0.2043	0.7920	1.0000
Z51	0.2398	0.7990	1.0000
Z50	-0.2050	0.8010	1.0000
Z29	-0.2394	0.8100	1.0000
Z39	-0.2064	0.8130	1.0000
Z25	-0.1669	0.8630	1.0000
Z2	-0.1197	0.9020	1.0000
Z3	0.0218	0.9750	1.0000
Z38	-0.0169	0.9850	1.0000

We also examined each of the five domains (present fatalistic, present hedonistic, future, past negative, and past positive) over time. When looking at the cross-sectional effects, the present fatalistic, present hedonistic, future, past negative, and past positive domains all had a significant p-value ($p < 0.01$). Table 5 shows the results for each of the domains.

Table 5: Baseline Zimbardo Time Perspective Inventory Results by Domain

Domain	Baseline coefficient	Standard Error	Standard Coefficient	p-value
Present Fatalistic	-1.978	0.463	-0.916	0.000
Present Hedonistic	-1.786	0.379	-0.678	0.000
Future	-1.607	0.314	-0.505	0.000
Past Positive	-1.657	0.350	-0.579	0.000
Past Negative	-1.672	0.374	-0.625	0.000

We also examined the longitudinal effects of each of the five domains. When looking at the longitudinal effects, none of the five domains were statistically significant. The only possible relevant factor might be the present hedonistic subscale which had a p-value of 0.094.

Table 6: Longitudinal Zimbardo Time Perspective Inventory Results by Domain

Domain	Longitudinal coefficient	Standard Error	Standard Coefficient	p-value
Present Fatalistic	4.853	4.940	23.972	0.326
Present Hedonistic	5.523	3.301	18.232	0.094
Future	3.103	2.269	7.043	0.171
Past Positive	1.247	3.020	3.765	0.680
Past Negative	-1.782	1.846	-3.289	0.334

DISCUSSION:

This study examines the longitudinal effects of time orientation on a health outcome during a smoking cessation intervention. When examining domains we found that the present fatalistic, present hedonistic, future, past negative, and past positive domains were all significant with p-values < 0.001. Unlike, in an earlier cross-sectional analysis where present orientation was the only statistically significant predictor, in the GEE model all five domains were significant. We feel this could be due a greater level of power generated by the multiple measurements per individual over time. We found that time orientation influenced smoking cessation. These results are in agreement with results from studies examining time orientation in drug and alcohol studies.

In contrast, to studies examining time orientation for drug and alcohol use, in this study we found that a range of time orientation domains are relevant for examining health behavior change. It is meaningful to not only examine whether an individual is present oriented or future oriented but to examine them both. In our study we found that present orientation decreased over time and that future orientation increased over time. There is

a benefit to examining time orientation in greater detail or more fully understanding the specific components of time orientation and to begin to understand the mechanisms between time orientation and health behavior outcomes.

However, we did not see strong evidence for a longitudinal effect of change in domain scores of time orientation over time. When we compared the number of cigarettes smoked by participants at the baseline assessment and at the six-month follow-up we saw that very few participants in this study had in fact stopped smoking. So, not seeing a longitudinal effect of time orientation on smoking status was not unexpected. To fully examine, the longitudinal effects of time orientation on smoking cessation over time, there needs to be a range of those who were able to quit and those who were not. In this study, we were unable to achieve that.

We did not find that present orientation was the most predictive. In contrast to our hypothesis, being present oriented was not the dominant time perspective in our sample. In fact, we saw that a greater number of participants were future oriented over time. This could be due to the fact that participants were enrolled in an intervention study. Receiving care and follow-up in regards to their smoking cessation attempt and to talk with our interviewers could have influenced the time orientation of the participants over time. A study examining time orientation of alcoholics by Lennings³⁵ was one of the only studies examining a group of substance users as they make their way through a quit attempt. Although, she did not find a statistically significant relationship between those who quit and those who did and time orientation, she did find that the mean levels for future orientation did differ between those two groups. Those who successfully completed the abstinence program were more future oriented. These results offer some evidence that time orientation plays a role in behavior change. However, Lennings study was very small (n=31), focused only the severely addicted and used only the 38-item version of the Zimbardo Time Perspective Inventory. Lennings attempted to examine time orientation in an alcohol treatment program. She also hypothesized that severely dependent drinkers would have a shortened and a negative perception of time. Although, she did not find statistically significant results for time orientation and treatment outcomes overall she acknowledged that the act of being in treatment could in fact alter time orientation, regardless of the risky or addictive behavior of participants prior to starting treatment. She also found that those who were future oriented had higher levels of self-efficacy, adding to the hypothesis that being in treatment may in fact promote future orientation and self-efficacy.

Klingemann³⁶ also collaborated findings by Lennings in his work in drug and alcohol clinics in Germany. He also acknowledged the possible effects of being in treatment settings and time orientation. He also noted how individual time concepts interact with the organizations objectives, time philosophy, and the temporal orientations of its staff members. In examining the differences between patients and staff, Klingemann found that patients in alcohol centers show a lower degree of future orientation (mean score of 3.65) and lower present hedonistic (mean score of 3.22). Patients in drug clinics had scores for time orientation scales as follows: future (mean score of 3.66) present hedonistic (mean score of 3.34) present risk (2.86). In addition, Klingemann was able to make comparisons to the general population who had the following mean scores future (3.78), present hedonistic (3.47) present risk (2.73) past

positive (2.95) and past negative (2.78). Staff at drug and alcohol clinics have lower present hedonistic orientation and lower present risk orientation.

This study suggests that it can be relevant to screen for patients time orientation at the beginning of a smoking cessation program and to tailor an intervention and/or program to match their time orientation. If programs are designed for future oriented then future oriented individuals may do well. However, if a participant is a present or past-oriented individual then they are mismatched to treatment and may not be as successful. Present oriented smokers need messages specifically related to how continuing to smoke has adverse effects on them in the moment. Advice related to health outcomes needs to be related to immediate, visible effects such dental care, smell, taste. Messages need to be focused on how continuing to smoke will influence their day-to-day living. It is important to recognize the environment and relationships of a present-oriented individual and to tailor messages and advice to that framework. It is also important to continue work on examining the role of time orientation on smoking cessation over time. There have now been a number of studies documenting the potential relevancy of time orientation as a predictor of outcome for smokers. There is a need however, to understand how time orientation fluctuates over time during an intervention. There is also a need to understand whether time orientation in general is the best predictor of success when looking at a health outcome or whether there needs to be behavior-specific time orientation assessments.

Limitations

One of limitations is that our study is comprised only of older adults and hence we are not able to make direct comparisons to middle life adults and hence limits the generalizability of our findings. Second, our sample is predominantly male and subsequently we cannot claim that our findings would be applicable to females. Our sample size is also limited and again influences the generalizability of our results. A study examining time orientation during a behavior change with equal numbers of women and men and with individuals across the age spectrum would contribute the questions that remain about the effects of time orientation on smoking cessation and on health outcomes in general. Our outcome, number of cigarettes smoked, was assessed by self-report and participants may have been influenced by social desirability factors to indicate that they had been successful in their quit attempt. However, self-report of smoking status is commonly accepted in prospective studies. Lastly, the participants in the study mostly were not able to stop smoking. There was a lack of distribution of our main outcome measure.

Conclusion

Given that time orientation is a salient factor for predicting smoking cessation, we need to evaluate existing smoking cessation treatment programs for their time orientation and to begin to recognize how time orientation influences treatment behavior modification in general.

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CONCLUSION

Time perspective may be an important predictor of success in smoking cessation programs. Thus, it is important to better understand the role of time perspective for smoking cessation. More specifically, there needs to a greater understanding of the role that time perspective plays in initiating a quit attempt and in the success of that quit attempt. We hope the information generated from this study will allow us to better understand the role of time perspective and behavior change and to make recommendations for improving smoking cessation treatment programs. Such a project would be valuable because it would allow for identification of specific attributes of the individuals who are more likely to succeed in a smoking cessation intervention and for tailoring of referrals to different forms of smoking cessation treatment to make them better matched to individual recipients. This individualized approach would conserve resources by allocating patients more appropriately to treatment. Gaining a clearer perspective on the relationship between time orientation and smoking cessation outcome will help us understand if treatment programs are appropriately designed for those who enter such programs.

In Chapter 1, we assessed the validity of the Zimbardo Time Perspective Inventory in an on-going intervention trial. We validated the Zimbardo Time Perspective Inventory in an adult population at the initiation of an intervention. We used exploratory factor analysis to determine the most appropriate number of dimensions. Our exploratory factor analysis was strong on all of the five factors that are part of the original Zimbardo Time Perspective Inventory. The future domain had the least number of items that clustered together and the present hedonistic domain was split into two separate factors.

In Chapter 2, we identified the time orientation of patients at entry into a smoking cessation program and explored the relationship of time orientation to other potential predictors of smoking cessation. We conducted a cross-sectional analysis and then examined how time orientation varied across socioeconomic factors. We found that there was a significant relationship between being present hedonistic and number of cigarettes smoked at baseline and that time orientation did differ across socioeconomic factors.

In Chapter 3, we examined the change for each individual item of the Zimbardo Time Perspective Inventory and number of cigarettes smoked from baseline to six months post-intervention. We examined each of the five domains, present fatalistic, present hedonistic, future, past negative and past positive and number of cigarettes smoked from baseline to follow-up. When examining domains longitudinally, the cross-sectional effect showed that the present fatalistic, present hedonistic, future, past negative, and past positive domains were all significant with p-values < 0.001.

This study suggests that it can be relevant to screen for patients time orientation at the beginning of a smoking cessation program. Time orientation is a salient predictor of smoking. However, we need to evaluate existing smoking cessation treatment programs for their time orientation and to begin to recognize how time orientation influences treatment behavior modification in general behavior modification.

Perceived Stress Scale

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, please indicate with a check how often you felt or thought a certain way.

1. In the last month, how often have you been upset because of something that happened unexpectedly?

- ₁ Never
- ₂ Almost Never
- ₃ Sometimes
- ₄ Fairly Often
- ₅ Very Often

2. In the last month, how often have you felt that you were unable to control the important things in your life?

- ₁ Never
- ₂ Almost Never
- ₃ Sometimes
- ₄ Fairly Often
- ₅ Very Often

3. In the last month, how often have you felt nervous and “stressed”?

- ₁ Never
- ₂ Almost Never
- ₃ Sometimes
- ₄ Fairly Often
- ₅ Very Often

4. In the last month, how often have you felt confident about your ability to handle your personal problems?

- ₁ Never
- ₂ Almost Never
- ₃ Sometimes
- ₄ Fairly Often
- ₅ Very Often

5. In the last month, how often have you felt that things were going your way?

- ₁ Never
- ₂ Almost Never
- ₃ Sometimes
- ₄ Fairly Often
- ₅ Very Often

6. In the last month, how often have you found that you could not cope with all the things that you had to do?
- ₁ Never
 - ₂ Almost Never
 - ₃ Sometimes
 - ₄ Fairly Often
 - ₅ Very Often
7. In the last month, how often have you been able to control irritations in your life?
- ₁ Never
 - ₂ Almost Never
 - ₃ Sometimes
 - ₄ Fairly Often
 - ₅ Very Often
8. In the last month, how often have you felt that you were on top of things?
- ₁ Never
 - ₂ Almost Never
 - ₃ Sometimes
 - ₄ Fairly Often
 - ₅ Very Often
9. In the last month, how often have you been angered because of things that were outside of your control?
- ₁ Never
 - ₂ Almost Never
 - ₃ Sometimes
 - ₄ Fairly Often
 - ₅ Very Often
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?
- ₁ Never
 - ₂ Almost Never
 - ₃ Sometimes
 - ₄ Fairly Often
 - ₅ Very Often

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Multidimensional Scale of Perceived Social Support

We are interested in how you feel about the following statements. Read each statement carefully. Indicate how you feel about each statement.

1. There is a special person who is around when I am in need.
 - ₁ Very Strongly Disagree
 - ₂ Strongly Disagree
 - ₃ Mildly Disagree
 - ₄ Neutral
 - ₅ Mildly Agree
 - ₆ Strongly Agree
 - ₇ Very Strongly Agree

2. There is a special person with whom I can share my joys and sorrows.
 - ₁ Very Strongly Disagree
 - ₂ Strongly Disagree
 - ₃ Mildly Disagree
 - ₄ Neutral
 - ₅ Mildly Agree
 - ₆ Strongly Agree
 - ₇ Very Strongly Agree

3. My family really tries to help me.
 - ₁ Very Strongly Disagree
 - ₂ Strongly Disagree
 - ₃ Mildly Disagree
 - ₄ Neutral
 - ₅ Mildly Agree
 - ₆ Strongly Agree
 - ₇ Very Strongly Agree

4. I get the emotional help and support I need from my family.
 - ₁ Very Strongly Disagree
 - ₂ Strongly Disagree
 - ₃ Mildly Disagree
 - ₄ Neutral
 - ₅ Mildly Agree
 - ₆ Strongly Agree
 - ₇ Very Strongly Agree

5. I have a special person who is a real source of comfort to me.

- 1 Very Strongly Disagree
- 2 Strongly Disagree
- 3 Mildly Disagree
- 4 Neutral
- 5 Mildly Agree
- 6 Strongly Agree
- 7 Very Strongly Agree

6. My friends really try to help me.

- 1 Very Strongly Disagree
- 2 Strongly Disagree
- 3 Mildly Disagree
- 4 Neutral
- 5 Mildly Agree
- 6 Strongly Agree
- 7 Very Strongly Agree

7. I can count on my friends when things go wrong.

- 1 Very Strongly Disagree
- 2 Strongly Disagree
- 3 Mildly Disagree
- 4 Neutral
- 5 Mildly Agree
- 6 Strongly Agree
- 7 Very Strongly Agree

8. I can talk about my problems with my family.

- 1 Very Strongly Disagree
- 2 Strongly Disagree
- 3 Mildly Disagree
- 4 Neutral
- 5 Mildly Agree
- 6 Strongly Agree
- 7 Very Strongly Agree

9. I have friends with whom I can share my joys and sorrows.

- 1 Very Strongly Disagree
- 2 Strongly Disagree
- 3 Mildly Disagree
- 4 Neutral
- 5 Mildly Agree
- 6 Strongly Agree
- 7 Very Strongly Agree

10. There is a special person in my life who cares about my feelings.

- ₁ Very Strongly Disagree
- ₂ Strongly Disagree
- ₃ Mildly Disagree
- ₄ Neutral
- ₅ Mildly Agree
- ₆ Strongly Agree
- ₇ Very Strongly Agree

11. My family is willing to help me make decisions.

- ₁ Very Strongly Disagree
- ₂ Strongly Disagree
- ₃ Mildly Disagree
- ₄ Neutral
- ₅ Mildly Agree
- ₆ Strongly Agree
- ₇ Very Strongly Agree

12. I can talk about my problems with my friends.

- ₁ Very Strongly Disagree
- ₂ Strongly Disagree
- ₃ Mildly Disagree
- ₄ Neutral
- ₅ Mildly Agree
- ₆ Strongly Agree
- ₇ Very Strongly Agree

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Zimbardo Time Perspective Inventory

Please respond to the following statements as honestly as possible. Before you answer, ask yourself “How characteristic or true is this of me?” Answer with the following choices: Very uncharacteristic, Uncharacteristic, Neutral, Characteristic, or Very Characteristic.

1. I believe that getting together with one’s friends to party is one of life’s important pleasures..

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

2. Familiar childhood sights, sounds, smells often bring back a flood of wonderful memories.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

3. Fate determines much in my life.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

4. I often think of what I should have done differently in my life.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

5. My decisions are mostly influenced by people and things around me.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

6. I believe that a person's day should be planned ahead each morning.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

7. It gives me pleasure to think about my past.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

8. I do things impulsively.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

9. If things don't get done on time, I don't worry about it.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

10. When I want to achieve something, I set goals and consider specific means for reaching those goals.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

11. On balance, there is much more good to recall than bad in my past.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

12. When listening to my favorite music, I often lose all track of time.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

13. Meeting tomorrow's deadlines and doing other necessary work comes before tonight's play.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

14. Since whatever will be will be, it doesn't really matter what I do.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

15. I enjoy stories about how things used to be in the "good old times."

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

16. Painful past experiences keep being replayed in my mind.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

17. I try to live my life as fully as possible, one day at a time. ₁ Very Uncharacteristic

- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

18. It upsets me to be late for appointments.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

19. Ideally, I would live each day as if it were my last.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

20. Happy memories of good times spring readily to mind.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

21. I meet my obligations to friends and authorities on time.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

22. I've taken my share of abuse and rejection in the past.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

23. I make decisions on the spur of the moment.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

24. I take each day as it is rather than try to plan it out.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

25. The past has too many unpleasant memories that I prefer not to think about.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

26. It is important to put excitement in my life.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

27. I've made mistakes in the past that I wish I could undo.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

28. I feel that it's more important to enjoy what you're doing than to get work done on time.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

29. I get nostalgic about my childhood.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

30. Before making a decision, I weigh the costs against the benefits.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

31. Taking risks keeps my life from becoming boring.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

32. It is more important for me to enjoy life's journey than to focus only on the destination.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

33. Things rarely work out as I expected.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

34. It's hard for me to forget unpleasant images of my youth.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

35. It takes joy out of the process and flow of my activities, if I have to think about goals, outcomes, and products

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

36. Even when I am enjoying the present, I am drawn back to comparisons with similar past experiences.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

37. You can't really plan for the future because things change so much.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

38. My life path is controlled by forces I cannot influence.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

39. It doesn't make sense to worry about the future, since there is nothing that I can do about it anyway..

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

40. I complete projects on time by making steady progress.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

41. I find myself tuning out when family members talk about the way things used to be..

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

42. I take risks to put excitement in my life.

- 1 Very Uncharacteristic
- 2 Uncharacteristic
- 3 Neutral
- 4 Characteristic
- 5 Very Characteristic

43. I make lists of things to do.

- 1 Very Uncharacteristic
- 2 Uncharacteristic
- 3 Neutral
- 4 Characteristic
- 5 Very Characteristic

44. I often follow my heart more than my head..

- 1 Very Uncharacteristic
- 2 Uncharacteristic
- 3 Neutral
- 4 Characteristic
- 5 Very Characteristic

45. I am able to resist temptations when I know that there is work to be done.

- 1 Very Uncharacteristic
- 2 Uncharacteristic
- 3 Neutral
- 4 Characteristic
- 5 Very Characteristic

46. I find myself getting swept up in the excitement of the moment.

- 1 Very Uncharacteristic
- 2 Uncharacteristic
- 3 Neutral
- 4 Characteristic
- 5 Very Characteristic

47. Life today is too complicated; I would prefer the simpler life of the past.

- 1 Very Uncharacteristic
- 2 Uncharacteristic
- 3 Neutral
- 4 Characteristic
- 5 Very Characteristic

48. I prefer friends who are spontaneous rather than predictable.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

49. I like family rituals and traditions that are regularly repeated.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

50. I think about the bad things that have happened to me in the past.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

51. I keep working at difficult, uninteresting tasks if they will help me get ahead.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

52. Spending what I earn on pleasures today is better than saving for tomorrow's security.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

53. Often luck pays off better than hard work.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

54. I think about the good things that I have missed out on in my life.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

55. I like my close relationships to be passionate.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

56. There will always be time to catch up on my work.

- ₁ Very Uncharacteristic
- ₂ Uncharacteristic
- ₃ Neutral
- ₄ Characteristic
- ₅ Very Characteristic

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