



Investigating the relationship between smoking and subjective welfare



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ABSTRACT

Using data from the Health Survey for England, we examine the effect of smoking behavior and smoking addiction (considering the frequency and intensity of smoking) on happiness and depression, two well-known measures of subjective wellbeing. We find that smoking and smoking addiction are associated with lower levels of happiness and higher levels of depression. This finding is robust to alternative ways of measuring smoking behavior, as well as to the methodological approach to estimation that addresses endogeneity. Specifically, comparing the Ordinary Least Squares (OLS) results with the two-stage least square (2SLS) results, we find that although the OLS results overstate the effects of smoking status and addiction on wellbeing, the emerging conclusion of a negative effect of smoking behavior is still valid in the case of 2SLS.

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1. Introduction

The costs of smoking have been well-documented for many western economies. In the United States, the cost is estimated at more than \$300 billion each year (Xu et al., 2014), of which nearly \$170 billion accounts for direct medical care for adults and more than \$156 billion accounts for lost productivity (of which \$5.6 billion is attributable to lost productivity resulting from second hand smoke exposure). A relatively large body of literature thus examines the impact of smoking (see, for example, Akl et al., 2010; Lakier, 1992; Lyvers et al., 2009; Rooke et al., 2013). One strand of this literature examines the impact of smoking on subjective wellbeing (see, for example, Kaliterna Lipovcan et al., 2013; Shahab and West, 2012), given that wellbeing has become well-established as an important measure of quality of life (Diener and Chan, 2011; Okun et al., 1984).¹

Our study aims to contribute to the literature that examines the effect of addictive behaviors on subjective wellbeing. Specifi-

cally, we seek to examine the effect of smoking behavior on happiness and depression using two common measures of subjective wellbeing. Understanding the implications of smoking is a major issue among public health and policy debates. It motivates various policies including government tariff decisions and bans on smoking (Barone-Adesi et al., 2006; Cesaroni et al., 2008; Thomas et al., 2008). The public health debate, however, has focused predominantly on the physical health implications of smoking (Akl et al., 2010; Lakier, 1992; Rooke et al., 2013).

The primary objective of our paper is to broaden our knowledge of the effects of smoking behavior on subjective wellbeing using English data. Specifically, we address the question: what is the effect of smoking and associated addictive behaviors on wellbeing in England? Using data from the 2014 Health Survey for England (HSE), we also address the endogenous nature of the relationship between smoking behavior and wellbeing, which has not received a great deal of attention in the existing literature. Smoking and wellbeing are, to a large extent, endogenous as some individuals smoke because they are stressed and less happy. Put differently, reverse causality may be an issue here as it is likely that happier people may be more inclined to give up or avoid smoking, while less happy people are more likely to take up smoking. Without controlling for the endogenous nature of this relationship, the direction of the effect of smoking behavior and the reported effect sizes may be biased. Thus, we address the endogenous nature of

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¹ In this study, our measure of subjective wellbeing is happiness drawn from individuals' evaluation of their happiness. Thus, we use the term subjective wellbeing and happiness interchangeably. Further, our measures of smoking primarily capture addictive behaviors rather than addiction itself. Accordingly, proxies for addiction used in this study primarily capture various addictive behaviors.

the relationship by adopting the novel [Lewbel \(2012\)](#) instrumental variable (IV) technique.

We contribute to the existing literature by using new, high quality data and by thoroughly addressing issues of endogeneity, to provide a new perspective on the effects of smoking on subjective wellbeing. We use a wider range of measures of smoking behaviors than have been used by previous studies in this area. More importantly, our study further contributes to the literature by exploring the role of smoking addiction on subjective wellbeing. Although our data does not contain a clinically defined addiction scale, we adopt measures of smoking intensity and frequency as proxies for levels of addiction and examine the effect of smoking and tobacco dependence on wellbeing. When attempting to measure tobacco addiction, a number of existing scales could be utilized, such as the Fagerstrom Test for Nicotine Dependence ([Heatherton et al., 1991](#)). Unfortunately, such an instrument is not available in our data; however, we consider a number of measures related to the frequency of tobacco consumption and the quantity/intensity of tobacco consumption as proxies for tobacco dependence in our analysis. Drawing on measures of individual self-reported happiness and depression, our results suggest that smoking status and smoking addiction negatively influence happiness and increase depression.

The remainder of the paper is structured as follows. [Section 2](#) provides a brief overview of the existing literature. [Section 3](#) presents a description of the data and variables, as well as an overview of the empirical strategy for the analysis. [Section 4](#) presents results and examines the robustness of these results. [Section 5](#) presents a brief discussion and conclusion.

2. Overview of existing literature and hypothesis

Existing literature has investigated the relationship between smoking and subjective wellbeing. Although many studies show that smoking has significant physical health implications and can ultimately lead to death (see, for example, [Akl et al., 2010](#); [Lakier, 1992](#); [Lyvers et al., 2009](#); [Rooke et al., 2013](#); [Weinhold and Chaloupka, 2016](#)), smokers nevertheless continue to smoke. This implies that, from a rational agent's perspective, they gain utility from the act of smoking (despite the potential negative health effects). [Becker and Murphy \(1988\)](#), in their theory of rational addiction, present a model where smokers behave rationally given their level (stock) of addiction.

Alternative rationalizations of smoking behaviors exist; for example, it is often argued that the use of tobacco can help regulate stress and mood, and thus in the short term, smoking could deal with stress, depressive symptoms and promote happiness ([Weinhold and Chaloupka, 2016](#)). That is, smoking may allow individuals to deal with stress thus increasing their ability to socialize and elevate overall life satisfaction. However, in the long term, this may not be the case, as smoking could lead to various psychological and quality of life issues.

Behavioral models for understanding cigarette consumption also exist. For example, in an extension of the rational addiction framework, [Orphanides and Zervos \(1995\)](#) include learning and regret, whereby an individual's subjective beliefs about their potential to become addicted play a significant role in addictive behaviors, and experimentation is important for informing that subjective belief.

In the broader addiction literature, it is common to find explanations for smoking that relate to loss of control due to the effects of nicotine on the human body, which result in cravings. In such instances, the individual can no longer be assumed to make optimal consumption decisions and this can lead to negative outcomes in terms of subjective wellbeing. Loss of control can lead to time inconsistent preferences and the introduction of self-control mechanisms to mitigate these factors ([Gruber and Köszegi, 2001](#)).

A more recent, fully behavioral, approach to understanding addictive consumption can be found in the work of [Bernheim and Rangel \(2004\)](#). Here, the ideas of mistaken consumption, environmental triggers and addicts attempting to self-regulate are central to the theoretical framework. A common theme in the departures from rational behavior is the inclusion of a set of observed behaviors into a formal optimization framework. The difficulty then becomes knowing which key behaviors to consider, and each author has presented arguments for their choice of behaviors to be modeled. The models either predict that once we account for addictive behaviors, smoking is utility generating, or that behavioral factors imply that even though smoking does not generate utility, individuals nevertheless may continue to smoke. Hence overall, the theoretical literature has focused on understanding smoking behaviors but remains inconclusive about whether smoking decreases or increases subjective wellbeing, thus making the determination of the relationship between smoking and wellbeing an empirical task (as noted by [Weinhold and Chaloupka, 2016](#)).

Empirically, the association between smoking and wellbeing has not received a great deal of attention in the existing literature. The literature on the effects of smoking focuses mainly on other outcomes and often comes to the conclusion of a negative effect. For instance, studies have shown an association between smoking and psychiatric issues ([Glassman, 1993](#); [Leonard et al., 2001](#)); smoking and anxiety ([Beckham, 1999](#)); smoking and general health ([Akl et al., 2010](#); [Lakier, 1992](#); [Rooke et al., 2013](#)); and smoking and psychological health ([Choi et al., 1997](#); [Lyvers et al., 2009](#)). These studies differ significantly from our study in various ways. For instance, [Beckham \(1999\)](#) focuses only on smoking among veterans, although their study examines anxiety, a phenomenon similar to depression. Further, their study focuses on a clinical sample of veterans who suffer from post-traumatic stress disorder. Other studies, such as those mentioned above, focus on outcome variables that are not measures of subjective wellbeing. However, at the aggregate level, [McCann \(2010\)](#) shows a negative relationship between smoking prevalence and wellbeing using state level variation in smoking prevalence. These results conflict with findings from [Chang et al. \(2016\)](#), which suggest that smoking makes people happy in a sample of five countries using country-level data on happiness and per capita cigarette consumption.

At the individual level, relatively little work has been conducted to understand the effects of smoking on people's happiness and subjective wellbeing. Related literature examines the impact of tobacco control policies and smoking bans on subjective wellbeing (see, for example, [Hinks and Katsaros, 2012](#); [Odermatt and Stutzer, 2015](#)) rather than the direct effects of smoking and addiction to smoking. The few studies that have examined the possible link between smoking and wellbeing are faced with issues of endogeneity (see, for example, [Kaliterna Lipovcan et al., 2013](#); [Shahab and West, 2012](#)). For instance, [Shahab and West \(2012\)](#), using a sample of the British population, provide evidence to suggest that smokers and recent ex-smokers report lower levels of life satisfaction compared to ex-smokers who have abstained from smoking for a period beyond 12 months. However, consistent with other studies, this study suffers from an omitted variable bias, and more importantly, endogeneity. One recent study that controls for endogeneity is that of [Weinhold and Chaloupka \(2016\)](#), who use changes in smoking-related policy over time as exogenous variation from which to identify the relationship between smoking status and subjective wellbeing, using a rich Dutch longitudinal dataset. The focus of their study is the difference in subjective wellbeing according to smoking status (i.e., never smoked, ex-smokers and current smokers). We go beyond this to use a comprehensive set of measures of smoking behavior to examine how smoking affects wellbeing.

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