



Working time and cigarette smoking: Evidence from Australia and the United Kingdom



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ABSTRACT

Cigarette smoking is a risk factor in a range of serious diseases, including cardiovascular disease, cancer, stroke and type II diabetes. Theory suggests that working long hours will increase smoking propensities among workers. Consequently there is a significant body of evidence on the relationship between working time and smoking. Results, however, are inconsistent and therefore inconclusive. This paper provides new evidence on how working time affects smoking behaviour using nationally representative panel data from Australia (from 2002 to 2011) and the United Kingdom (from 1992 to 2011). We exploit the panel design of the surveys to look at within-person changes in smoking behaviour over time as working time changes. In contrast to most previous studies, this means we control for time invariant aspects of personality and genetic inheritance that may affect both smoking propensities and choice of working hours. We find that working long hours tends to increase the chances that former smokers will relapse, reduce the chances that smokers will quit and increase cigarette consumption among regular smokers, and that these effects tend to become more pronounced for workers who usually work very long hours (50 or more hours a week) compared to those who work moderately long hours (40–49 h a week).

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1. Introduction

Cigarette smoking is a risk factor in a range of serious diseases, including cardiovascular disease (Ezzati et al., 2005a), cancer (Ezzati et al., 2005b), stroke (Shinton and Beevers, 1989) and type II diabetes (Rimm et al., 1995). Consequently there is a very large body of empirical research that seeks to identify the risk factors that make smoking more likely and increase smoking intensity. One strand of this literature looks at the role of work in influencing smoking behaviour, focussing particularly on the role of working hours and psycho-social conditions at work (e.g., Lallukka et al., 2008; Macy et al., 2013). However, the evidence from this research, which is based mainly on cross-sectional analysis of specific occupations and workplaces, is inconsistent and therefore inconclusive. Our study provides new evidence on this issue by analysing nationally representative panel survey data from both

Australia and the United Kingdom (UK). We exploit the panel design of the surveys to look at changes in smoking behaviour within the same individuals over time as working conditions change, allowing us to control for time-invariant individual characteristics and draw stronger inferences about causality.

Why might working conditions, and long hours of work in particular, increase the likelihood of smoking? Smokers experience smoking as a stress relieving activity (Jarvis, 2002), and if working is a stressful activity it follows that work would increase smokers' propensities to smoke. Long hours of work may act as a stressor for two reasons. First, workers tend to feel less happy, less relaxed and more anxious or stressed when at work than when taking part in most other activities (Kahneman et al., 2004; Bryson and MacKerron, 2013). Second, if a job is particularly demanding, it may only be possible to meet those demands by working long hours. Therefore, long hours of work may be an indicator of other stressors.

A number of studies have attempted to identify links between working time and smoking. A systematic review of this research was conducted by van der Hulst (2003) who identified seven studies. Six of these were based on small samples from a single

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occupation or organisation, while the one study with a much larger sample size ($N = 3917$) was of a single occupation (nurses). Only one was based on longitudinal data and within-person analysis (Step toe et al., 1998). This study was the only one to find any relationship between long hours of work and smoking. Specifically, it found that smoking intensity increases as working hours increase. However, it was based on just 71 workers in a single department store in the UK, so the extent to which its findings can be generalised to other contexts is unclear.

Turning to research conducted since the publication of van der Hulst's review, Mizoue et al. (2006) examined the relationship between working overtime and smoking intensity in a cross-sectional sample of 642 male Japanese office workers. This study identified a u-shaped relationship between smoking intensity and overtime, with those working moderate amounts of overtime smoking less than both those who worked low or high levels of overtime. Radi et al. (2007) studied smoking status and intensity among a cross-sectional sample of 1101 Australians from the state of Victoria. They found that long working hours (50 or more per week) were associated with a higher propensity to smoke among men (but not greater smoking intensity). Lallukka et al. (2008) studied the relationship between psycho-social job stress, working overtime (defined as a usual working week of more than 40 h) and smoking among civil servants aged 45–60 in London, Helsinki and Japan ($n = 11,680$). Their results differed between men and women and between geographical locations. Surprisingly, they found that men in Japan and Helsinki who worked overtime hours smoked less than other workers. Macy et al. (2013) investigated the effects of changes in working time on a range of health risk behaviours, including smoking among a community based sample from the American mid-west ($n = 3984$). They found no relationship between an increase in hours worked and daily smoking activity, although they did not test specifically for the effects of changes to long-hours working.

Additionally, there are two studies of the relationship between smoking and working time based on broadly nationally representative panel data but which only utilised between-person methods. Albertsen et al. (2004) studied the determinants of quitting smoking among 3606 Danish workers. They found that working long hours (41 h or more a week) had no impact on smoking cessation. Taris et al. (2011) examined the relationship between harmful behaviours (an index based on the combined intensity of smoking and alcohol consumption) and overtime working. They found no relationship between an increase in harmful behaviour and the number of overtime hours worked among a sample of 649 full-time employees in the Netherlands. A common limitation to both studies is that the measures of working time do not differentiate effectively between moderately long working hours and very long working hours.

We are aware of only one study that has employed a large ($n = 3830$) nationally representative sample to examine changes in within-person smoking behaviour over time (Shields, 1999). This Canadian study found that when men move from working 40 h or less per week to more than 40 h a week, their odds of increasing daily smoking activity doubled, while for women the odds quadrupled.

In summary, there are two important shortcomings in existing studies, at least one of which afflicts all the studies discussed above except Shields (1999). First, most use samples covering a particular occupation, workplace and/or age group. Therefore the extent to which the results can be generalised is limited. Second, all studies except Shields (1999) and Step toe et al. (1998), employ methods that describe how the relationship between working time and smoking varies between subjects rather than within subjects over time. This is important, because methods based on between-

subject comparisons do not account for time-invariant aspects of personality and genetic inheritance, which might partially account for both the propensity to smoke and choice of working hours. It is only by studying changes in smoking behaviour within individuals as working time changes that we can obtain estimates of the relationship between working time and smoking that are not biased by failure to account for these unobserved individual characteristics.

The study reported in this article is designed to overcome these limitations. It analyses the relationship between working time and cigarette smoking using data from two large, long-running nationally representative panel surveys. This permits analysis of within-person changes in working time and within-person changes in both smoking status (quitting or starting smoking) and smoking intensity, so reducing the scope for results to be biased due to omitted variables. The nationally representative nature of the data also means that we can generalise to the wider populations of Australia and the UK. Finally, and in contrast to most previous research, we use detailed measures of working time that capture the difference between moderately long working hours and very long working hours. In short, we are able to offer a far more rigorous test of the hypothesis that long working hours result in the adoption of less healthy lifestyles than any previous study.

Additionally, both Australia and the UK have a similar approach to the regulation of working time, with ample scope provided for workers in both countries to work for longer than the stipulated maximum hours if they or their employers wish. Specifically, in Australia, while the National Employment Standards stipulate a 38 h working week, they also provide for 'reasonable additional hours' and hence voluntary overtime (paid or unpaid) is common. Similarly, while in the UK there is a notional 48 h maximum working week, under the terms of the European working time directive employees may opt out from the requirements of the directive if they wish. The two countries also share a common language, cultural heritage and similar legal system. Therefore, the two-country comparison allows us to examine whether the results are consistent (and therefore less likely to be the result of chance) across countries with broadly similar contextual characteristics.

2. Methods

2.1. Data

Our data come from two stratified random household panel surveys: the Household, Income and Labour Dynamics in Australia (HILDA) Survey, and the British Household Panel Survey (BHPS). Both conduct annual interviews with all adult members (defined as 15 years or older in the HILDA Survey and 16 years or older in the BHPS) of a nationally representative sample of households. Both have similar automatic sample replenishment rules; when a survey participant leaves a household an attempt is made to track them into their new household, which then joins the survey. New persons who join a sample household, including children, are added to the samples. Thus, with the exception of new immigrants who arrive in the country after the studies commenced, the surveys should remain broadly representative of the populations from which they are drawn.

Described in more detail in Watson and Wooden (2012), the HILDA Survey began in 2001. An initial responding sample of 7682 households was achieved (66% of households approached). Annual re-interview rates (the proportion of respondents from one wave who are successfully interviewed the next, after excluding deaths and moves abroad) are reasonably high, rising from 87% in wave 2 to over 94% by wave 5. In the following survey waves (2006–2011) the re-interview rate has been relatively stable, averaging almost

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