



The predictive utility of micro indicators of concern about smoking: Findings from the International Tobacco Control Four Country study



Timea R. Partos^a, Ron Borland^{a,*}, James F. Thrasher^b, Lin Li^a, Hua-Hie Yong^a, Richard J. O'Connor^c, Mohammad Siahpush^d

^a The Cancer Council Victoria, 615 St Kilda Road, Melbourne, Victoria 3004, Australia

^b Department of Health Promotion, Education and Behavior, Arnold School of Public Health, University of South Carolina, Health Sciences Building, 215, 800 Sumter Street, Columbia, SC 29208, USA

^c Department of Health Behavior, Roswell Park Cancer Institute, Elm & Carlton Streets, Buffalo, NY 14263, USA

^d Department of Health Promotion, Social and Behavioral Health, College of Public Health, University of Nebraska Medical Center, 984365 Nebraska Medical Center, Omaha, NE 68198–4365, USA

HIGHLIGHTS

- Micro indicators of concern about smoking prospectively predict making quit attempts.
- This predictive capacity is only partly mediated by intentions.
- Stubbing out cigarettes indicates increased difficulty to quit among smokers.

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ABSTRACT

This study explored the association between six “micro indicators” of concern about smoking (1. stubbing out cigarettes before finishing; 2. forgoing cigarettes due to packet warning labels; thinking about... 3. the harms to oneself of smoking; 4. the harms to others of one's smoking; 5. the bad conduct of tobacco companies; and 6. money spent on cigarettes) and cessation outcomes (making quit attempts, and achieving at least six months of sustained abstinence) among adult smokers from Australia, Canada, the United Kingdom, and the United States of America. Participants were 12,049 individuals from five survey waves of the International Tobacco Control Four Country Survey (interviewed between 2002 and 2006, and followed-up approximately one year later). Generalized estimating equation logistic regression analysis was used, enabling us to control for within-participant correlations due to possible multiple responses by the same individual over different survey waves. The frequency of micro indicators predicted making quit attempts, with premature stubbing out, forgoing, and thinking about the harms to oneself of smoking being particularly strong predictors. An interaction effect with expressed intention to quit was observed, such that stubbing out and thinking about the harms on oneself predicted quit attempts more strongly among smokers with no expressed plans to quit. In contrast, there was a negative association between some micro indicators and sustained abstinence, with more frequent stubbing out, forgoing, and thinking about money spent on cigarettes associated with a reduced likelihood of subsequently achieving sustained abstinence. In countries with long-established tobacco control programs, micro indicators index both high motivation by smokers to do something about their smoking at least partly independent of espoused intention and, especially those indicators not part of a direct pathway to quitting, reduced capacity to quit successfully.

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1. Introduction

Tobacco use is a chronic, relapsing behavior (Fiore, Jaen, Baker, et al., 2008), as most smokers want to quit and make a number of attempts to quit over a period of years (Borland, Partos, Yong, Cummings, & Hyland, 2012; CDC, 2011). This suggests sustained negative attitudes to smoking. Expressed motivation and attitudes to smoking predict making quit attempts (Borland et al., 2010; Hyland et al., 2006; Zhou et al., 2009). This research is grounded in cognitive theories of behavior

* Corresponding author. Tel.: +61 3 9514 6291.

E-mail addresses: Timea.Partos@cancervic.org.au (T.R. Partos), Ron.Borland@cancervic.org.au (R. Borland), thrasher@mailbox.sc.edu (J.F. Thrasher), Lin.Li@cancervic.org.au (L. Li), Hua.Yong@cancervic.org.au (H.-H. Yong), Richard.O'Connor@RoswellPark.org (R.J. O'Connor), msiahpush@unmc.edu (M. Siahpush).

change, whereby intentions predict the “actions” that may ultimately lead to the maintenance of healthy behavior, and the desire to quit translates into intentions, which lead to quit attempts or other activities related to the desired behavior change (Vangeli, Stapleton, Smit, Borland, & West, 2011). However, negative attitudes only appear to translate into attempts to quit from time to time, with smokers on average making only around two attempts to quit each year, only one of which lasts a day or more (Borland et al., 2012).

The challenge of smoking cessation is to persist in a task in the face of ongoing contingencies which create strong impulses to smoke. Understanding this challenge requires a reconceptualization of decisional balance away from a simple balancing of the pros and cons of acting (Janis & Mann, 1977), to one between rational, executive preferences and the operational contingencies of the moment (Borland, 2014). The likelihood of making a quit attempt in any given period is theorized to be related to the frequency with which reasons for quitting are made salient, and the capacity for sustained executive control when the thought of quitting is activated; that is, not too many competing demands (Borland, 2014). Measures of attitude accessibility have been shown to predict behavior over and above the valence of the attitude (Fazio & Olson, 2003; Fazio, Sanbonmatsu, Powell, et al., 1986). Thus someone convinced that they should quit, but who never thought about it may be less likely to try to quit than someone initially less certain, but who thinks about it a lot. Frequently worrying about the health consequences of smoking can increase a smoker's motivation to quit (Costello, Logel, Fong, Zanna, & McDonald, 2012; Magnan, Koblitz, Zielke, & McCaul, 2009; McCaul, Mullens, Romanek, Erickson, & Gatheridge, 2007; McCaul et al., 2006) or make the idea of quitting more salient, and be associated with increased quit attempts (Borland et al., 2010).

Smokers also take actions from time to time that fall short of initiating a full attempt to quit such as forgoing cigarettes and premature stubbing out of cigarettes in response to thoughts about the harms (Borland, 1997). Originally, these micro-behaviors were conceptualized as partial initiations of action, in a context where the smoker was unready to transform this into a full-blooded attempt, but which may contribute to them learning strategies that ultimately help them successfully quit (Borland, 1997). We refer to the occurrence of thoughts and behavioral responses collectively as *micro indicators* of concern about smoking, as they are situation-based consequences of underlying beliefs, but are not inevitable consequences of holding the beliefs. Micro indicators can be elicited by either contextual factors or active executive consideration of the issue. A tendency for them to occur concurrent with the act of smoking, or when tempted to smoke, may indicate a greater readiness to resist smoking, and thus to make a quit attempt.

Micro indicators have been shown to increase in frequency following population level anti-smoking interventions such as warning labels on cigarette packets (Borland, 1997; Borland, Wilson, et al., 2009) and advertising campaigns (Borland & Balmford, 2003; Trotter, 1998). The behavioral micro indicators forgoing a cigarette and prematurely stubbing one out, have both been shown to predict subsequent quit attempts (Borland, 1997; Borland, Wilson, et al., 2009; Borland, Yong, et al., 2009; Borland et al., 2010). Greater frequency of prematurely stubbing out cigarettes has also been found to be strongly associated with failure among those trying to quit (Borland et al., 2010). A similar paradoxical relationship has also been observed among smokers with a history of more frequent and/or more recent quit attempts being more likely to make further attempts, but being less likely to maintain abstinence when they tried (Partos, Borland, Yong, Hyland, & Cummings, 2013). These findings have been theorized to possibly mean that the occurrence of micro indicators, at least after an initial quit attempt, might indicate a high desire to quit, but a lack of ability to sustain the effort; that is, anybody who really wanted to quit and who tries multiple times, is manifestly demonstrating a lack of ability to sustain his intention (Borland et al., 2010). Rather than these activities representing preliminary steps, those micro indicators that are not part of a necessary path to making attempts (i.e., other than thinking about the harms),

may be more displacement activities taken as a means of doing something in the face of the task of quitting being seen as beyond them. Thus such measures may be able to be used to identify smokers who will find it more difficult to quit and may be in need of extra cessation assistance. The aim of this study is to better understand how micro indicators relate to cessation outcomes and whether the cognitive and behavioral indicators have different relationships. We are also interested in whether the relationships between micro indicators and quitting are independent of an expressed desire to quit, in particular whether they can predict cessation outcomes among smokers with no immediate plans to quit. This latter group is of considerable interest as they are routinely excluded from many studies of cessation outcomes.

2. Methods

2.1. Participants

Participants were adult smokers from the International Tobacco Control (ITC) Four Country (Australia, Canada, the UK and USA) study, who were recruited using stratified random sampling and computer-assisted telephone interviewing. The ITC aims to then follow up participants annually, regardless of whether they have quit or are still smoking, and the numbers lost to attrition are replenished at each follow-up with new smokers from the same sampling frame. Further information on ITC survey methodology, including the derivation of basic demographic variables, has been published elsewhere (Borland et al., 2012). The present analyses focus on the first 6 waves of the study (occurring approximately yearly between 2002 and 2007) as questions relating to the micro indicators were not consistently included in later waves.

We investigated the role of micro indicators at one wave (the baseline wave) on participants' cessation outcomes at the subsequent wave (the follow-up wave). Participants were eligible if they were smoking at least monthly at the baseline wave (17,862 potential participants), and were retained in the study for at least one follow-up wave (30.6% were excluded for being lost to follow-up), and also provided valid data on all the baseline variables of interest (2.9% were excluded for missing data). This resulted in a final sample of 12,049 individuals providing 25,978 observations across 5 baseline-to-follow-up wave pairs (44.4% contributed data to only one, 22.0% to two, 14.8% to three, 8.5% to four, and 9.4% to all 5 wave pairs). It should be noted that participants who contributed data to multiple wave pairs were necessarily still smoking at the multiple baseline waves, thus those who quit at any follow-up wave were unable to provide data on predictors at that wave, but could again do that on subsequent waves if they relapsed back to smoking.

2.2. Measures

2.2.1. Micro indicators of concern about smoking (measured at baseline)

We assessed 6 micro indicators relating to concern about smoking. All pertained to the 1 month period preceding each baseline survey. Two of the micro indicators were behaviors, scored on a 4-point scale (1 = never, 2 = once, 3 = a few times, or 4 = lots of times): 1) *have you stubbed/butted out a cigarette before you finished it because you thought about the harm of smoking*; and 2) *have the pack warning labels stopped you from having a cigarette when you were about to smoke one?* Due to low prevalence in some categories, stubbing out was recoded to *never*, *once/a few times*, and *lots of times*, and forgoing was recoded to *never* versus *at least once* for most analyses. The remaining four micro indicators concerned the frequency of thoughts, scored on a 5-point scale (1 = never, 2 = rarely, 3 = sometimes, 4 = often, or 5 = very often): *How often did you think about...* 1) *the harm your smoking might be doing to you*; 2) *the harm your smoking might be doing to others*; 3) *the bad conduct of tobacco companies*; and 4) *the money you spend on smoking*. Exploratory factor analyses showed that the items did not form a single underlying construct, so they are treated individually in all analyses.

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