Six-Month Outcomes of a Multi-Campus Smoking Cessation Contest

Julie Dawn Wilson

Submitted in partial fulfillment of the requirements for the degree of
Master of Arts in Applied Health Sciences

Supervisor: Dr. Kelli-an Lawrance

Faculty of Applied Health Sciences, Brock University
St. Catharines, Ontario

Julie Dawn Wilson © August 2006
# TABLE OF CONTENTS

- LIST OF TABLES ................................................................. 6
- LIST OF FIGURES ............................................................. 7
- ABSTRACT ............................................................................. 8
- LITERATURE REVIEW ........................................................... 10
  - Tobacco Use ...................................................................... 10
  - Tobacco-Related Morbidity and Mortality .......................... 10
  - Prevalence of Tobacco Use .............................................. 11
  - Overall trends ................................................................. 11
  - Age specific trends .......................................................... 11
  - Young adults’ tobacco use ................................................ 12
- Tobacco Control .................................................................. 13
  - Reducing Tobacco Use .................................................... 13
  - Rationale for reducing tobacco use .................................... 13
  - Young adults and smoking cessation ................................. 15
  - Rationale for reducing tobacco use among young adults ...... 16
- Tobacco Use on Campus ....................................................... 17
  - Social Contexts of Tobacco Use on Campus ....................... 17
  - Contexts that support smoking ......................................... 18
  - Stress .............................................................................. 18
  - Alcohol use ...................................................................... 19
  - Social norms supporting smoking ..................................... 20
  - Tobacco marketing supporting smoking on campus .......... 21
- Patterns of Tobacco Use by Students ..................................... 22
  - Summary .......................................................................... 24
- Promoting Smoking Cessation on Campus ............................. 24
  - Rationale and Potential Cessation Strategies ...................... 24
  - Rationale for promoting smoking cessation ....................... 24
  - Availability of smoking cessation initiatives for post-secondary students ......................................................... 25
  - Population-based cessation interventions ......................... 28
  - Maximizing intervention efficacy .................................... 28
  - Maximizing intervention dissemination ............................. 29
Using Motivational Contests to Promote Cessation

Overview
Efficacy of contests
Potential for harm reduction
Reach of contests

Contests For Young Adult Smokers

'Let's Make A Deal!' Contest for Post-Secondary Students

Description of Leave The Pack Behind

Purpose
Research Questions
Contest categories
Contestants who quit
Contestants who do not quit

METHODOLOGY

Participants
University Selection
Participant Selection
Materials
Baseline Questionnaire
Demographic data
Smoking status and behaviour
Quitting behaviours
Self-efficacy to resist smoking
Intervention Check

3-Month Follow-Up Interview
Smoking behaviour
Quitting status
Quitting behaviours
Self-efficacy to resist smoking

6-Month Follow-Up Interview

Procedures
Contest
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contest deals</td>
<td>48</td>
</tr>
<tr>
<td>Contest interventions</td>
<td>48</td>
</tr>
<tr>
<td>Prize draw</td>
<td>49</td>
</tr>
<tr>
<td>Baseline Procedures</td>
<td>50</td>
</tr>
<tr>
<td>3-Month Follow-Up</td>
<td>51</td>
</tr>
<tr>
<td>6-Month Follow-Up</td>
<td>54</td>
</tr>
<tr>
<td>Ensuring Participants’ Confidentiality</td>
<td>54</td>
</tr>
<tr>
<td>DATA ANALYSES</td>
<td>56</td>
</tr>
<tr>
<td>Entry and Data Screening</td>
<td>56</td>
</tr>
<tr>
<td>Analyses of Contestants’ Behaviours</td>
<td>56</td>
</tr>
<tr>
<td>RESULTS</td>
<td>59</td>
</tr>
<tr>
<td>Sample Recruitment</td>
<td>59</td>
</tr>
<tr>
<td>Generation of Baseline Sample</td>
<td>59</td>
</tr>
<tr>
<td>Description of Baseline Sample</td>
<td>59</td>
</tr>
<tr>
<td>Final Sample</td>
<td>62</td>
</tr>
<tr>
<td>Generation of Final Sample</td>
<td>62</td>
</tr>
<tr>
<td>Representativeness of Final Sample</td>
<td>64</td>
</tr>
<tr>
<td>Characteristics of Quit For Good and Keep The Count Participants</td>
<td>68</td>
</tr>
<tr>
<td>Comparing Participants</td>
<td>68</td>
</tr>
<tr>
<td>Demographic characteristics</td>
<td>68</td>
</tr>
<tr>
<td>Smoking behaviours and cognitions</td>
<td>68</td>
</tr>
<tr>
<td>Environmental factors</td>
<td>69</td>
</tr>
<tr>
<td>Contest Outcomes</td>
<td>69</td>
</tr>
<tr>
<td>Smoking Cessation</td>
<td>69</td>
</tr>
<tr>
<td>Definition and assessment of smoking cessation</td>
<td>69</td>
</tr>
<tr>
<td>Cessation outcomes for each deal</td>
<td>71</td>
</tr>
<tr>
<td>Methods of Quitting</td>
<td>78</td>
</tr>
<tr>
<td>Methods of Dealing with Withdrawal</td>
<td>79</td>
</tr>
<tr>
<td>Comparing Quitters to Continuing Smokers</td>
<td>79</td>
</tr>
<tr>
<td>Characteristics of Quitting</td>
<td>82</td>
</tr>
<tr>
<td>Continued Tobacco Use</td>
<td>86</td>
</tr>
<tr>
<td>Tobacco Consumption</td>
<td>86</td>
</tr>
</tbody>
</table>
Contest Efficacy to Resist Smoking and Attempts To Quit .............................. 86
Unsuccessful Quitting .............................................................................. 88
DISCUSSION .......................................................................................... 93
Contest Outcomes .................................................................................. 93
Smoking Cessation Outcomes ................................................................. 93
Harm Reduction Outcomes ..................................................................... 97
Other Outcomes ...................................................................................... 99
Sample Characteristics ........................................................................... 102
Strengths and Limitations ....................................................................... 103
Future Research ....................................................................................... 108
Conclusions ............................................................................................. 111
REFERENCES ........................................................................................ 114

APPENDICES

Appendix A: Baseline Questionnaire
Appendix B: Intervention Script
Appendix C: 3-Month Follow-Up Interview Questions
Appendix D: 6-Month Follow-Up Interview Questions
Appendix E: Selected Pages from Smoke|Quit
Appendix F: Script and Print for Obtaining Informed Consent
Appendix G: Participant Tracking Form
Appendix H: Proposed Analyses and Reasons for Modification
Appendix I: Comparisons of Participants Who Did and Did Not Provide
3-Month Follow-Up Data
LIST OF TABLES

Table 1: Number of Contestants and Study Participants from Each University ........... 60
Table 2: Baseline Characteristics Sample ................................................................. 61
Table 3: Number of Participants from Each University who Completed Follow-Up
        Assessments ......................................................................................................... 63
Table 4: Baseline Characteristics of Participants Completing 6-Month, 3-Month
        (Only) or No Follow-Up ....................................................................................... 65
Table 5: Quitting Patterns by Contest Deal ................................................................. 78
Table 6: Methods Used By Quitters to Deal With Withdrawal .................................... 80
Table 7: Association Between Self-Identified Smoking Status and Cessation
        Outcome ................................................................................................................... 83
Table 8: Baseline Efficacy to Resist Smoking and Tobacco Consumption of Early
        (Sustained) Quitters, Late Quitters and Continuing Smokers ............................... 84
Table 9: Barriers Preventing Successful Quit Attempts By Continuing Smokers ...... 90
LIST OF FIGURES

Figure 1: Smoking Prevalence By Age Group, 2000-2005 ........................................... 12
Figure 2: Quitting Patterns of Quit For Good Contestants ........................................... 72
Figure 3: Quitting Patterns of Quit For Good Contestants Using Intention-to-Treat
   Analyses .................................................................................................................. 74
Figure 4: Quitting Patterns of Keep The Count Contestants ......................................... 75
Figure 5: Quitting Patterns of Keep The Count Contestants Using Intention-to-Treat
   Analyses .................................................................................................................. 77
Figure 6: Mean Efficacy To Resist Smoking of Participants Who Quit Smoking
   During The Contest ................................................................................................. 85
Figure 7: Mean Number of Cigarettes Smoked in the Past Week By Continuing
   Smokers ................................................................................................................... 87
Figure 8: Efficacy to Resist Smoking for Continuing Smokers ....................................... 87
Figure 9: Number of Quit Attempts Made By Continuing Smokers in Past 3
   Months ................................................................................................................... 89
ABSTRACT

Background: Up to 40% of North American post-secondary students smoke at least occasionally, and most want to quit. Given students' preferences for free, easy-to-access, self-directed, convenient cessation methods, a motivational, incentive-based cessation contest may be an effective way to assist students to quit. The current study describes 3- and 6-month outcomes experienced by post-secondary student smokers who entered the 'Let's Make A Deal!' contest.

Methodology: Contestants from five university campuses who chose to quit completely ('Quit For Good') or reduce their tobacco consumption by 50% ('Keep The Count') were invited to participate in a study of the contest. Three and six months after registration, participants were contacted by phone to assess their smoking and quitting behaviours. Qualitative and quantitative measures were collected, including weekly tobacco consumption, efficacy to resist temptations to smoke, use of quitting aids, and strategies to cope with withdrawal. Quitting was assessed using 7-day point prevalence and continuous abstinence.

Results: Seventy-four (64.9%) of the 114 participants recruited for the study completed the follow-ups. Over 31% of participants who entered Quit For Good and 23.5% of participants who entered Keep The Count were identified as quitters at the 6-month follow-up. Among the quitters, 45.5% experienced sustained abstinence from smoking for the 6-month duration of the study. Keep The Count contestants reduced their tobacco consumption by 57.2% at 3-month follow-up and sustained some of this reduction through to the 6-month follow-up. Qualitative data provides insights into how quitters coped with withdrawal and what hampered continuing smokers' efforts to quit.
Significance: A motivational, incentive-based contest for post-secondary students can facilitate both smoking cessation and harm reduction. The contest environment, incentives, resources, and "buddies" provide positive structural and social supports to help smokers overcome potential barriers to quitting, successfully stop smoking, and manage potential triggers to relapse. The contest cessation rates are higher than the typical 5-7% associated with unassisted quitting.
LITERATURE REVIEW
Tobacco Use

Tobacco-Related Morbidity and Mortality

Inhaling the smoke of burnt tobacco leaves first began 2,500 year ago, but it has only been over the past 50 years that empirical evidence has accumulated, irrefutably showing the associated risk of smoking with a variety of diseases, including lung cancer and emphysema (Doll, 1998). Currently, tobacco use is a known or probable cause of at least 25 different diseases including cancer, coronary heart disease, peripheral vascular disease, and bronchitis (WHO, 1999). In fact, cigarettes consumed exactly as intended by the manufacturers will result in half of all long-term users dying prematurely of tobacco-related disease (Peto, 1994).

Use of this deadly product remains the leading preventable cause of death worldwide (WHO, 2003). Annually, smoking results in 5 million deaths worldwide and this figure is expected to double within the first half of the 21st century (12th World Conference on Tobacco or Health, 2003). Projections indicate that smoking will cause 450 million premature deaths in the next 50 years – 170 million of which could be avoided if current smoking rates were cut in half (Peto, Lopez, Boreham, Thun, & Heath, 1994). As dire as these numbers are, a recent study by Warren, Jones, Eriksen, and Asma (2006) suggested that these projections are probably underestimations. Currently, over 45,000 Canadians die of tobacco-related diseases equalling approximately one Canadian every 11 minutes (Heath Canada, 2006). The number of deaths caused by tobacco use is higher than the number of deaths resulting from homicides, suicides, AIDS, illicit drug use, and automobile crashes combined (Manley, 1987; U.S. Department of Health and
Human Services, 1992; Black, Loftus, Chatterjee, Tiffany, & Babrow, 1993). By the year 2020, deaths related to tobacco use are estimated to become the leading cause of life-years lost across the globe (DeNoon & Key, 1996). By this time, it is estimated that 22% of all deaths will be tobacco-related in a number of countries, a 4% increase from today (WHO, 1999).

Prevalence of Tobacco Use

Overall Trends

The World Health Organization estimates that approximately one-third of the adult population in the world smoked cigarettes in 1999; this represented 1.1 billion smokers worldwide (WHO, 1999). In Canada, there are approximately 5 million smokers (CTUMS, 2005). Based on data collected between February and June 2005, 19% of Canadians aged 15 and older are current smokers: 15% are regular and 4% smoke occasionally (CTUMS, 2005).

Age Specific Trends

Despite the widely-reported finding that smoking prevalence is decreasing among Canadian adolescents aged 12 to 17, the proportion of young adults aged 18 to 24 smoking remains high (CTUMS, 2005). As shown in Figure 1, it has been the case for a number of years now that the highest prevalence of smoking is seen among young adults, 19 to 24 years of age. Approximately 26% of this cohort smoke. This compares to 18% of those aged 15-19 and 19% of all Canadians 15 years and older (CTUMS, 2005).
Young Adults' Tobacco Use

Within the young adult cohort, two sub-groups are frequently distinguished: those who still attend school, and those who have entered the workforce (i.e., “adult” career path). Studies are inconclusive regarding which of these two groups is more likely to smoke. Research into young adult workers' use of tobacco suggests that 20-30% smoke and that most are daily smokers (Escobedo & Peddicord, 1996; Gilpin et al., 2003). On the other hand, studies of Canadian and American post-secondary students suggest that as few as 22% or as many as 40% of students smoke at least occasionally (Emmons, Wechsler, Dowdall & Abraham, 1998; Wechsler, Rigotti, Gledhill-Hoyt, & Lee, 1998;
Everett & Husten, 1999; Cairney & Lawrance, 2002; Adlaf, Gliksman, Demers, & Newton-Taylor, 2003; Borders, Xu, Bacchi, Cohen & SoRelle-Miner, 2005; Ott, Cashin & Altekruse, 2005). Of even greater concern are findings suggesting that the prevalence of smoking on campuses is increasing. For example, Lantz (2003) noted an increase in tobacco use among college students. She argues that this rise is attributable to increases in the numbers and social diversity of young adults entering college and the concomitant shift in demographic characteristics (and particularly socio-economic backgrounds) of the ‘new’ college population. In their examination of smoking prevalence among college students, however, Wechsler et al. (1998) argued that the increase in smoking prevalence from 22.3% in 1993 to 28.5% in 1997 should be a matter of great public concern: it represents a 28% increase in smoking prevalence over a four-year span. Overall, recent studies have recognized that the rate of smoking onset during university may be greater than originally estimated (Choi, Harris, Okuyemi & Ahluwalia, 2003; Wetter et al., 2004; Hammond, Costello & Fong, 2004).

Tobacco Control

Reducing Tobacco Use

Rationale for Reducing Tobacco Use

In a retrospective study on male British physicians, Doll, Peto, Boreham and Sutherland (2004) found that smokers who began smoking in early adulthood and continued smoking tripled age specific mortality rates. However, cessation at the age of
50 for these smokers reduced the risk of mortality by 50%, and cessation at 30 years of age almost completely eliminated the age specific mortality rate hazard.

Peto, Darby, Deo, Silcocks, Whitley and Doll (2000) came to similar conclusions in their investigation of the association between smoking, smoking cessation and lung cancer. Examining trends since 1950, they found the subsequent risk of lung cancer associated with smoking could be avoided if cessation occurs. Quitting during middle age can significantly reduce the risk of lung cancer, while quitting prior to middle age can reduce the risks associated with tobacco use by over 90%. Clearly, earlier cessation is associated with reduced health risk and improved morbidity and mortality outcomes.

Warren and other members of the *Global Tobacco Surveillance System (GTSS) Collaborative Group* emphasize the importance of early cessation, stating, “reduction of tobacco consumption will need a redoubling of efforts to prevent initiation and promote cessation in young people who currently smoke and use other tobacco products” (Warren et al., 2006, p. 753). This sentiment is echoed by the Expert Panel on the Renewal of the Ontario Tobacco Strategy (Ashley et al., 2000). According to the Panel, in order for the tobacco disaster to be abated, action is needed in many areas – tobacco pricing, public education, retail controls, smoke-free spaces and supports for smoking cessation – for all ages.

Within this framework of comprehensive tobacco control, cessation strategies are extremely important, and as noted above, addressing young people’s tobacco use is critical (Peto et al, 1994; Ashley et al, 2000; Peto et al, 2000; Doll et al, 2004; Warren et al, 2006). Unfortunately, young adults’ tobacco use has not been adequately addressed (Emmons et al, 1998; Wechsler et al, 1998; Everett et al, 1999; Hammond et al., 2004).
In fact, when one considers that North American tobacco control efforts have traditionally addressed smoking prevention among adolescents (Backinger, Fagan, Matthews, & Grana, 2003) and smoking cessation among older adults (Del Greco, Breitbach, Rumer, McCarthy, & Suissa, 1986; Glynn, 1989; Buck & Morgan, 2001; Anonymous, 2001; Winickoff, Buckley, Palfrey, Perrin, & Rigotti, 2003), the high prevalence of smoking among young adults may not be a complete surprise. Young adults’ smoking has not been systematically addressed in tobacco control efforts. Furthermore, despite evidence that the numerous school-based tobacco use prevention programs, policies, and supports directed at high school students have proven somewhat effective, only recently have similar interventions been introduced on college and university campuses (Wechsler, Kelley, Seibring, Kuo, & Rigotti, 2001; Halperin & Rigotti, 2003; Dalhousie University, 2003; Lakehead University, 2004; York University, 2006a). As a result, reducing smoking prevalence among young adults has remained a challenge.

Young Adults and Smoking Cessation

Although the serious health consequences of tobacco use are well-established, and meaningful decreases in smoking prevalence have occurred for Canadian teens, smoking by young adults remains high (CTUMS, 2005). This is concerning given that these individuals remain at risk for continued smoking and the consequent ill effects of tobacco use (Gilpin, White & Pierce, 2005). For example, using data from a cross-sectional, population-based, random-digit-dialed household survey, and extrapolating risk factors from previous research, Gilpin et al. (2005) concluded that 43% of young adults are at
risk for future smoking. Those individuals who are most at risk of future smoking include young adults who have tried or are currently smoking, who live with second-hand smoke in their environments, and who patronize bars or nightclubs.

*Rationale for Reducing Tobacco Use among Young Adults*

Efforts to reduce young adults' tobacco use are clearly needed. In this regard, post-secondary students offer a large and important audience for smoking cessation interventions. There are some compelling reasons to target university students. First, with nearly 1 million full-time and part-time students enrolled in universities across Canada in 2003-2004, the total number of students who smoke is substantial (Statistics Canada, 2005).

Second, not only are 50% of young adults in school, but they represent a relatively homogeneous and accessible group for tobacco control efforts. The majority of students are around the same age, live on or near the campus, visit the campus at least weekly (if not daily), and use services on campus. Homogeneity and accessibility facilitate an understanding of the needs of the audience and allow interventions to be effectively tailored to meet those needs of the audience.

Third, post-secondary institutions have a 'duty' to promote the health of students (Jackson & Weintein, 1997; Swinford, 2002). As a result, campuses are open to offering specific tobacco control interventions. Many university and college campuses across North America are becoming aware of the high rates of tobacco use on campus and are beginning to offer cessation programming, primarily through the campus health centres.
Finally, post-secondary students may well be the next generation of leaders. Because they serve as role models to youth, and have the potential of leading social and political trends now and in the future, it is desirable that their smoking status be smoke-free.

Due to the number of young adults attending a post-secondary institution, the widespread accessibility to this group, the duties to assist the leaders of tomorrow, and their impact on future generations, students were chosen as the focus for the tobacco control intervention under investigation in this study.

Tobacco Use on Campus

*Social Contexts of Tobacco Use on Campus*

There is some anecdotal evidence that Canadian universities are slowly moving their campuses towards becoming less smoking tolerant (Halperin & Rigotti, 2003). Unfortunately, the social, political, and physical environments on most Canadian campuses tend to be supportive of smoking (Hammond, Tremblay, Chaiton, Lessard, & Callard, 2005). This tobacco-friendly environment includes: a range of social situations and everyday stressors that encourage smoking onset and continuation (Sciacca & Melby, 1992); social norms supporting tobacco use (Page, 1998; MacLean et al., 2000; Cairney & Lawrance, 2002; Watson, Clarkson, Donovan, & Giles-Corti, 2003); and, the marketing of tobacco and absence of policies and readily available supports to discourage
smoking and promote smoking cessation (Black et al., 1993; Koerner, 1997; Wechsler et al., 1998; Everett & Husten, 1999; Wechsler et al., 2001; Sepe, Ling, & Glantz, 2002). Below, these tobacco-friendly facets of the campus environment are examined in greater detail.

*Contexts that Support Smoking*

**Stress.** Time in university represents a period of change from adolescence to adulthood (Sax, 1997; Arnett, 2000). Within a relatively short time span, students must develop more independence from their family, create new friendships, and choose their future career path (D’Zurilla & Sheedy, 1991, Parker, Summerfeldt, Hogan, & Majeski, 2004). Many students experience considerable stress as a result of the everyday hassles of university life, ongoing intrapersonal challenges, financial difficulties, and pressures related to alcohol and drug use (Ross, Niebling & Heckert, 1999; Phinney & Haas, 2003; Adlaf, Demers, & Gliksman, 2004). Numerous studies suggest that the accumulation of stress in students’ lives tends to correlate with unhealthy coping practices, including smoking (Sciacca & Melby, 1992; Naquin & Gilbert, 1996; Hudd et al., 2000). Sciacca and Melby (1992), for example, found that 33.6% of female and 17.5% of male students surveyed reported frequently eating, drinking, or smoking to deal with stress. Similarly, Saules and her colleagues determined that young women who experienced greater feelings of depression and more dieting concerns during the first year of university were also more likely to start smoking during their studies than were their peers who did not experience these stressors (Saules et al., 2004). In a student focus group examining
null
smoking imagery in the media, students reported identifying with the stress relieving aspects of smoking (Watson et al., 2003).

Ironically, as the frequency of students’ unhealthy coping behaviours increased, so did the severity of the stress symptoms themselves. Naquin and Gilbert (1996) found college students who were smokers reported significantly higher rates of perceived stress compared to their non-smoking counterparts. An examination of trends in freshmen student health over the 30-year period between 1966 and 1995 also revealed this pattern (Sax, 1997). The percentage of students who reported feeling frequently overwhelmed rose steadily from 16% in 1985 to 25.3% in 1995. During this same time period, the proportion of college students smoking daily went from an all-time low in 1987 to a 20-year high in 1995. And by all accounts, both stress level and smoking prevalence have continued to rise since the 1990s (Sax, 1997).

*Alcohol use.* Besides coping with stress, students must also respond to social situations that centre on alcohol consumption. In examining drinking rates among Canadian university students aged 17 to 25, Gliksman, Adlaf, Demers and Newton-Taylor (2003) found that 87% of these students drank alcohol. Statistics are similar for American students, with Roche and Watt (1999) reporting that 94% of American students consume alcohol. Given that there is a strong link between alcohol use and tobacco consumption, greater alcohol use can be expected to coincide with greater prevalence of smoking on campus (Zimmerman, Warheit, Ulbrich, & Auth, 1990; Breslau, Peterson, Schultz, Andreski, & Chilcoat, 1996; Dee, 1999; Budd & Preston, 2001; McClure, Wetter, de Moor, Cinciripini, & Gritz, 2002; Wetter et al., 2004; Nichter et al., 2006). Indeed, among first year college students, McKee (2004) found that of the times students
smoked, 74% occurred while under the influence of alcohol. Similarly, in their examination of college student “social smokers” (i.e., students who primarily smoke with others as opposed to smoking alone), Moran and colleagues found that being a social smoker was significantly more common for smokers who were binge drinkers (Moran, Wechsler, & Rigotti, 2004). Finally, in a qualitative study examining the smoking behaviour of college “party smokers” (i.e. students who smoke most of their cigarettes at parties and minimal, if any, cigarettes during the week), Nichter et al (2006) found that these smokers reported alcohol reduced their inhibitions which encouraged them to smoke. Furthermore, these students reported drinking and smoking as going together like “peanut butter with jelly” (p. 223). Those students who were still in the process of initiating smoking felt drinking alcohol reduced the negative physical effects of smoking such as coughing and throat irritation.

Social Norms Supporting Smoking

The rising number of post-secondary students who use tobacco, even occasionally, suggests that smoking may be a normative behaviour on university campuses. Wechsler et al (1998) found that 11% of college students smoked their first cigarette after arriving on campus; and a number of researchers have determined that many high school student smokers begin to smoke on a daily basis upon entering college (Baranowski et al., 1997; Everett & Husten, 1999). Choi et al. (2003) studied high school students’ smoking and then conducted follow-up interviews four years later with students who were currently in college. Of the students who had never smoked in high school, over 37% were smokers or had been smokers during their time in college.
A study conducted by Stockdale, Dawson-Owens and Sagrestano (2005) at a U.S. university examined the social influences on smoking initiation among smokers who began smoking prior to 18 years old and those who began smoking after the age of 18. They found the majority of smokers on campus (72.5% - 76.3%) began, maintained or increased smoking during the time they were in college. Students who had ever smoked in their lifetime were more likely to increase than decrease their consumption while at university.

All together these studies indicate that the onset of smoking or the escalation from infrequent to regular smoking occurs for some young adults during post-secondary education. This suggests a certain level of social acceptance of smoking. Indeed, both Page (1998) and Ott et al. (2005) determined that students greatly over-estimated the proportion of their peers who smoke, a misperception that suggests smoking is seen as a widespread practice.

_Tobacco Marketing Supporting Smoking on Campus_

Young adults are the youngest market segment to which tobacco companies can legally advertise their products (Tobacco Act, 1997, section 2). Tobacco marketing strategies aimed squarely at young adults are apparent on post-secondary campuses. For example, in a survey of key informants (i.e., student union executives, retail store managers, campus newspaper editors, campus bar managers, health services representatives, and university or college administrators) from 22 universities and 13 colleges, Hammond et al. (2005) found that 100% of universities and 46% of colleges had been approached within the past year to participate in forms of tobacco marketing.
and all had received money for tobacco marketing. Twenty percent of universities had hosted at least one tobacco sponsored event on campus. Prominent features of tobacco industry-sponsored events include ‘cigarette girls,’ dancers on raised podiums, well-stocked display cases of cigarettes, and numerous projection screens showing tobacco promotions alternating with logo-framed, live-action shots. Branded ashtrays and matches are on every table, and posters advertising tobacco are common; and if a contest is part of the event, registration procedures prompt patrons to consent to receive direct-mail tobacco promotions, including invitations to future tobacco-sponsored events. That these events do promote smoking is evidenced by the finding that attending a tobacco industry-sponsored event at a bar, nightclub or campus party seems to be associated with initiation or escalation of tobacco use among students (Rigotti, Moran, & Wechsler, 2005).

In addition to industry-sponsored events, cigarette sales and point of purchase advertising occur on most Canadian campuses. Half of the post-secondary institutions surveyed by Hammond et al. (2005) had received financial incentives to display tobacco products in campus stores. Additionally, 80% had advertised tobacco products in the campus newspapers. In fact, until recently-imposed legislative bans on print advertising came into effect, advertising in student newspapers was also common: in 2001/2002, tobacco ads appeared in every edition of many Ontario university student newspapers.

Patterns of Tobacco Use by Students

In general, Canadian post-secondary students smoke less often, and consume fewer cigarettes than adult smokers. On the other hand, more young adults than adults
smoke (CTUMS, 2005). Ott et al. (2005) found, for example, that 31.4% of college smokers indicated smoking on a daily basis, but 41% reported smoking in the past month and 57.2% reported smoking in the past year.

Although lower than adults’ rates, rates of smoking among university students should not be dismissed. As Gilpin et al. (2005) note in their study of young adults’ risk for future smoking, risk declines with age, but the decline is much less steep among young adults who have previously smoked. They also note that the risk of future smoking is much higher among young adults who patronize bars and nightclubs – a behaviour that is quite common among students.

Moran et al. (2004) also provide evidence that the relatively low rates of tobacco use among college students should not be dismissed lightly. They found social smoking had an inverse relationship to quitting intentions and having made a recent quit attempt. This finding contradicts a considerable body of evidence showing that light smokers are more successful at quitting than heavy smokers (Katz & Singh, 1986; Glasglow, Klesges, Klesges, & Somes, 1988; Cohen et al., 1989; Hennrikus, Jeffery, & Lando, 1995; Zellweger, 2001; Falba, Jofre-Bonet, Busch, Duchovny, & Sidelar, 2003; Vanasse, Niyonsenga & Courteau, 2004; Tong, Ong, Vittinghoff & Pérez-Stable, 2006). As Moran et al. (2004) suggest, it may be that social smokers do not quit smoking because they do not see themselves as “smokers”. Majchrzak, Park and Rigotti (2002) agree with this assessment. They argue that, because social smokers do not see themselves as smokers and do not perceive a need to quit, they will eventually become nicotine dependent and at risk for long term smoking and tobacco-related illnesses.
Summary

Overall, the research shows that, on most university campuses, the absence of smoking prohibitions, combined with the presence of pervasive tobacco advertising and supportive social influences, provide a favourable backdrop for smoking initiation or escalation. Given the relatively tobacco-friendly environment of campuses, it is unsurprising that many university students smoke at least occasionally. With large numbers of post-secondary students smoking cigarettes, the need for accessible student-focused smoking cessation programming is apparent. Unless interventions are available on campus, and appeal to students who are light, non-regular users of cigarettes, post-secondary students will remain at risk for continued smoking.

Promoting Smoking Cessation on Campus

Rationale and Potential Cessation Strategies

Rationale for Promoting Smoking Cessation

Considering that so many structures on campus support smoking, countering these conditions is imperative. College years represent a period of transition from adolescence to adulthood where behaviour change is common (Sax, 1997; Arnett, 2000). Research suggests that individuals who begin smoking later in life and who smoke a lighter amount have a greater chance of quitting successfully than heavier smokers who began smoking at a young age (Coambs, Li, & Kozolowski, 1992; Breslau & Peterson, 1996). With the smoking behaviours of many university students reflecting this pattern of late onset and light smoking, effective campus-based smoking cessation programs have the potential to
assist these smokers to quit at the point in their lives when it may still be relatively easy for them to do so.

Fortunately, although smoking among young adults may be on the rise (Lantz, 2003), there is a high level of interest in quitting within this population (Black et al., 1993; Wechsler et al., 1998; Everett & Husten, 1999; Patterson, Lerman, Kaufmann, Neuner, & Audrain-McGovern, 2004; Ott et al., 2005; Rooney, Silha, Gloyd, & Kreutz, 2005). Wechsler et al (1998) determined that half of the post-secondary students in their national survey had made a quit attempt in the past year and Ott et al. (2005) found that 89% of student smokers wanted to quit before graduation. This trend is true for both genders, Everett and Husten (1999) found that quit attempts were reported equally among men and women. Likewise, even the youngest segment of the young adult cohort expresses a desire to quit. Stanton, McClelland, Elwood, Ferry and Silva (1996) found that 81% of the 18-year old daily smokers in their study reported trying to quit or reduce the amount they smoked over the course of one year.

Availability of Smoking Cessation Initiatives for Post-Secondary Students

There is evidence that smoking cessation programs enhance smokers’ success at quitting: for example, unaided cessation yields a quit rate of approximately 5-7% (Baillie, Mattick, & Hall, 1995), while using nicotine replacement therapy has an average quit rate of 15% (Tang, Law, & Wald, 1994). Interventions which enhance self-efficacy also enhance quit success. Bandura (1994) defines self-efficacy as “people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives” (p. 71). Research has demonstrated a strong link between
smokers’ self-efficacy to resist smoking and their ability to quit smoking and remain smoke-free (Amodei & Lamb; 2005; Etter, Bergman, Humair & Perneger, 2000; Stuart, Borland, & McMurray, 1994; Gulliver, Hughes, Solomon, & Dey, 1995; Shiffman et al., 2000). For example, Amodei and Lamb (2005) determined that self-efficacy to resist smoking predicted abstinence even when controlling for confounds such as length of time as a smoker. In their investigation of spontaneous quitting during young adulthood (i.e., during the five years following graduation from secondary school), Tucker, Ellickson and Klein (2002) found that girls who felt greater efficacy to resist smoking in a variety of social situation were more likely to quit than their less efficacious counterparts; boys who felt more efficacy to resist an offered cigarette were also more likely to quit. Segan, Borland and Greenwood (2002) differentiated between smokers’ confidence in their ability to quit, and self-efficacy to resist situational temptations to smoke. They found that smokers’ confidence in their ability to quit was predictive of making a quit attempt, but self-efficacy about ability to resist situational temptations to smoke predicted whether they remained smoke free. Overall, these finding speak to the importance of self-efficacy throughout the process of a successful quit attempt, and suggest why smoking cessation interventions (that invariably address self-efficacy) enhance quitting success relative to unaided quitting.

Perhaps with appropriate assistance, more students would fulfill their desire to quit. Unfortunately, there seem to be very few smoking cessation initiatives available to university students. For example, although 89% of students reported a desire to quit smoking prior to university graduation, only 8% could name a smoking cessation or prevention program and fewer than 17% reported that a campus health professional
offered assistance around quitting (Ott et al., 2005). Wechsler et al. (2001) reported that fewer than 40% of the 393 4-year colleges they surveyed offered assistance in quitting, despite high numbers of student smokers. Indeed, the current comprehensive review of literature revealed no more than a handful of studies of smoking cessation interventions on post-secondary campuses, and all of these interventions appeared to have been implemented exclusively for the study rather than as a service to students (Black et al., 1993; O’Neill, Gillispie, & Slobin, 2000). Perhaps as a result of this situation, virtually all studies of post-secondary smoking call for interventions to be developed for and disseminated to this audience (Cairney & Lawrance, 2001; Wechsler et al., 1998; Wechsler et al., 2001; Gliksman et al., 2003; Moran et al., 2004; Patterson, Lerman, Kaufmann, Neuner & Audrain-McGovern, 2004).

Wechsler et al (2001) voiced the need for campus based smoking cessation programs by saying “the disparity between large numbers of students who are attempting to quit [smoking] and the availability and participation in smoking cessation programs on many campuses must be remedied” (p.211). Adlaf et al. (2003) reinforced this urgency, calling for tobacco control policies throughout university campuses in order to combat the high prevalence of smoking among students. In the end, considering that university students are attempting to quit, but are generally unsuccessful in doing so, there is an immediate need for effective smoking cessation initiatives to be implemented on campus (Wechsler et al., 1998; Everett & Husten, 1999; Obermayer, Riley, Asif, & Jean-Mary, 2004; Patterson et al., 2004).
Population-Based Cessation Interventions

In tobacco control research and practice, the value of population-based interventions has been recognized (King, Flora, Fortmann, & Taylor, 1987; Lando, Loken, Howard-Pitney, & Pechacek, 1990; Adlaf et al., 2003). Population-based interventions differ from conventional clinical or individual interventions. The latter are often heavily dependent upon professional interventions with individual smokers. Thus, while clinical, individual interventions can be highly effective at stimulating cessation, they reach a very limited proportion of the population of smokers.

Compared to individual-based interventions, population-based interventions can be less efficacious at promoting quitting. However, they are more accessible to a larger proportion of the smoking population. The rationale for a population based-approach is as follows: an intervention that helps 25% of smokers quit, but only reaches 1% of the total population of smokers ultimately has a smaller impact on overall smoking prevalence than an intervention that helps 10% of smokers quit but reaches 5% of the total population. Thus, population-based smoking cessation interventions take into account both the efficacy of the intervention at promoting cessation and the likelihood that the intervention will disseminate widely through the target audience. And, to the degree that efficacy and reach (dissemination) are maximized, a population-based intervention is effective at reducing smoking prevalence in a target population.

Maximizing intervention efficacy. To a large degree, research into the efficacy of smoking cessation interventions has reached a point of saturation (Lancaster, Stead, Silagy & Sowden, 2000; Zhu, Melcer, Sun, Rosbrook & Pierce, 2000). Despite continued efforts to find a magic bullet, published reviews of methods of quitting all lead to similar
conclusions: optimal quit rates range from a low of 5-7% for unassisted quitting to a high of 20% for intensive interventions combining pharmacological treatments with individual behaviour counselling (Coleman & West, 2001). Recognizing that the clinical approach will result in limited cessation success due to the number of at-risk smokers, Lichtenstein and Glasgow (1992) explain that “the relatively low quit rates for even the most intensive programs testify to the strength of the multiple societal, psychological, biobehavioral, and biological processes that maintain smoking behaviour” (p. 524) and propose that “rather than try to fit smoking cessation into our clinical paradigms, it is better to take a broader view and join the clinical and public health perspectives” (p. 525).

For the most part, researchers and health professionals agree that further reductions in smoking prevalence and smoking will depend not on marginal improvements in the efficacy of specific quit methods, but on finding ways to maximize use of smoking cessation interventions among the greatest number of smokers. In other words, they agree that attention should be directed toward improving dissemination of proven interventions.

*Maximizing intervention dissemination.* Dissemination of smoking cessation interventions can be enhanced by offering smokers methods of quitting that they prefer and see as desirable to use (Black & Cameron, 1997; Lawrance, 2001; Backinger et al., 2003). With respect to university smokers, options such as individual counselling, formal group programs, and reactive hotlines do not figure prominently among smokers’ preferred methods (Lawrance, 2001). Instead, research shows that young adult smokers prefer unassisted quit methods that are inexpensive and convenient to access and use, and do not involve consulting with a health professional (Gillespie, Stanton, Lowe, & Hunter,

A study by Black et al. (1993) found that university students would be more likely to participate in a cessation program that was convenient, close to their place of residence, included flexible program hours, involved “reminders” and could include friends’ participation. In search of a new approach to campus smoking cessation programs that are convenient, easy-to-use, and accessible, Obermayer et al. (2004) attempted to create an individualized cessation program delivered through text messaging to college students’ cell phones. Despite the innovative approach of this cessation program, at 6-week follow-up fewer than half of the participants had made at least one 24-hour quit attempt (Obermayer et al., 2004).

In interviews with young adult student smokers and ex-smokers attending a Canadian university, Kishchuk, Tremblay, Lapierre, Heneman, and O’Loughlin (2004) found participants suggested smoking cessation programs should not focus on a rigid “no-smoking” message or focus solely on “smoking”. Instead, interventions should help students explore their personal and social identities. The programs should target naturally occurring groups and include an aspect of social support.

In addition to the smoking cessation components listed above, university students also seem unwilling to use an assisted quit method with an accompanying cost. Hines (1996) found that a nominal fee of $15 reduced the probability that students will use that method by 20%. Others report that social costs can deter use. For example, Mooney (2001) argued that students may be more likely to use campus-based smoking cessation services if they can “bring a friend” (rather than be alone), and if “one-stop” help is
offered (as opposed to referring students to multiple centers, and increasing the effort they must exert to initiate or follow through with services).

Using Motivational Contests to Promote Smoking Cessation

Overview

Based on preferences of young adults for self-directed, convenient, flexible, inexpensive interventions, the types of smoking cessation programs that may be most appealing to them appear to include interventions such as self-help programs (in print or electronic format), hotlines, or motivational contests (Black et al., 1993; Mooney et al., 2001). While self-help and hotline interventions have received more attention in the research to date, there has been less research into motivational contests for young adults (Abdullah, Mak, Loke, & Tai-Hing, 2005; An, Shu-Hong, Nelson, Arikian, Nugent, Partin, & Joseph, 2006; Anonymous, 2006; Bloom, McBride, Pollak, Schwartz-Bloom, & Lipkus, 2006; Lancaster & Stead, 2006; Rooney, Silha, Gloyd & Kreutz, 2005).

Nevertheless, there is some indication that contests may be especially well-suited to the preferences of young adult smokers (and thus deserving of attention). There is evidence, for example, that smoking cessation contests held in the community at large tend to attract a younger group of smokers than other community-based programs, such as a smoking cessation class and a self-help quit smoking kit (Altman, Flora, Fortmann & Farquhar, 1987). Additionally, contests are consistent with research into adolescents’ and young adults’ preferred methods of quitting. For example, Leatherdale and McDonald (2005) found high school students’ preferred to quit on their own or use the advice of
their friends. Most of these students reported never wanting to use approaches which are commonly recommended for youth, such as self-help booklets, quit lines, or talking to their doctor. Lawrance (2001) determined that more than half of the teen and young adult smokers in her study supported the idea of a school-wide smoking cessation challenge, saying they would be more likely to quit if they were provided with an opportunity to win a prize. Similarly, Gillespie et al (1995) found that including a monetary award for a successful quit period of 1-year was the most popular incentive among the adolescent smokers comprising their sample. Even in an older cohort of college students, financial incentives may enhance the appeal of an intervention (Hines, 1996). All together, it appears that motivational contests that offer incentives for quitting may represent a highly preferred type of intervention.

**Efficacy of Contests**

Motivational contests have been used in contexts ranging from worksite and community challenges to international competitions (Glasgow, Klesges, Mizes, & Pechacek, 1985; Elder et al., 1987; King et al., 1987; Lando, Loken, Howard-Pitney, & Pechacek, 1990; Puska, Korhonen, Korhonen, Vertio, & Mannonen, 1998; McAlister et al., 2000; Hennrikus et al., 2002; Hahn et al., 2005). Studies of contest outcomes have shown that 4- to 6-month quit rates can range from approximately 25% to 40% (Lando et al., 1990; Koffman, Lee, Hopp, & Emont, 1998; Hahn et al., 2005; Hawk et al., 2006). In studies that have included a one-year follow-up, quit rates have ranged from 11% to 55% (King et al., 1987; Lando, Pirie, Dusich, Elsen & Bernards, 1995; Croghan et al., 2001; Hahn et al., 2005). Bains, Pickett and Hoey (1998) conducted a systematic review of
population-based smoking cessation programs including only studies that presented quit rates or participation rates. They found that of the 17 studies examining incentive-based cessation programs, mean quit rates at 1-year were 23%. There is similar evidence of the success of community-based contests, such as Ontario’s ‘Quit and Win’ (Puska et al., 1998).

Overall, contests generally produce quit rates that are considerably higher than typical, unassisted quit rates: even the modest quit rate of 11% produced in a Minnesota county contest (Croghan et al., 2001) is higher than the typical 5-7% rate of success associated with unassisted quitting (Baillie et al., 1995). The large discrepancy in quit rates has sometimes been attributed to contest features such as prize value and novelty of the contest. Considering that prize values have ranged from $125 to $10,000 it may not be surprising that quit rates have varied widely.

Potential for Harm Reduction

Researchers and health professionals agree that one of the primary solutions to smoking-related morbidity and mortality is cessation. Unfortunately, not all smokers feel they have the ability to quit completely; nor do all have the desire to do so. For these smokers, smoking reduction is a viable goal, and will contribute to a reduction in certain tobacco-related illnesses (Bolliger et al., 1999; Zellweger, 2001). Based on evidence that successfully cutting down the amount smoked can assist smokers to increase their self-confidence and advance toward quitting, harm reduction approaches have recently gained favour among some health professionals in the tobacco control field. In a review of harm reduction as an alternative to smoking cessation, Zellweger (2001) concluded that, among
smokers who reduced their tobacco consumption, there is ultimately a much higher rate of smoking cessation than there is even in a motivated population. This supports the view that encouraging reductions in tobacco consumption can move smokers toward quitting. Bolliger et al (2000) found that 38 out of 400 smokers who volunteered for a randomized controlled trial examining the effectiveness of oral nicotine inhalers who initially did not want to quit, reported being smoke-free upon completion of the observation period two years later. Indeed, an earlier study of smoking-related outcomes associated with a motivational contest revealed that while 14.2% of participants quit upon a 6-month follow-up, 81.3% had cut back or were attempting to do so (Elder et al., 1987). It appears that contestants who did not successfully achieve or maintain their smoke free status are still motivated to take steps to reduce their smoking.

Reach of Contests

In addition to producing respectable quit rates, contests may also entice more smokers to attempt to quit than would without such an incentive. For young adult students in particular, contests provide many benefits over other population-based cessation programs, including accessibility, ease of use, and low cost. Contestants can access the smoking cessation program without having to set up an appointment with a health professional and can sign up at any time during the contest registration period. Many contests offer contest registration forms online, thereby providing even more accessibility (Canadian Cancer Society, 2006). The contest does not require any scheduled meeting time or involvement beyond the registration thus making it extremely
easy to use. Finally, there is no cost to the contestant which can provide further incentive to participant (McAlister et al., 2000).

If the contest was offered in a campus setting, these benefits could be even more enticing to students. All of the benefits, such as accessibility, ease of use, and low-cost, would be enhanced. Additionally, contest promotions and prizes could be better tailored to the student audience. Tailoring interventions to the characteristics of audience has been shown to increase effectiveness (Orleans et al., 1998). Finally, because students tend to rely on their campus service providers to offer health promotion programs, they may feel especially comfortable registering for a campus-based contest.

Contests For Young Adult Smokers

Motivational contests could be an effective population based strategy for promoting smoking cessation and reduction among young adults. As Glasgow et al. (1985) state “such contests may have a considerable public health impact ... and provide valuable information about the quitting process” (p. 911). Furthermore, because contests are consistent with young adults’ preferences for self-directed and accessible interventions, contests may be highly appealing to this audience. The prize incentive may be an especially appealing feature: as McAlister et al., (2000) note, “even small prizes can attract participation in an economically disadvantaged population” (p.112). Because day-to-day school life for the majority of post-secondary students is typically accompanied by a tight budget, a monetary incentive, even a small one, would likely be an attractive feature in a smoking cessation program. Finally, depending on how they are structured, contests have the potential to enhance smokers’ self-efficacy to quit. For
example, some contests have made self-help materials, quit lines, or social support available to all registrants (Hahn, 2004). These supports would directly or indirectly aid smokers to develop greater self-efficacy for quitting (e.g., by offering motivational, skill-building, and confidence-boosting strategies for success quitting).

Thus, providing that they are effective for young adult smokers, contests have the potential to have a positive effect on smoking prevalence within post-secondary campuses. While research into students’ preferred methods of quitting suggests that motivational contests may be an appealing intervention, the effectiveness of this strategy for promoting smoking cessation among young adults has yet to be established for this cohort. In the only published study on the effectiveness of a Quit and Win contest at a post-secondary institution, Rooney et al. (2005) found that the quit rates at the end of the contest period (seven weeks after registration) were 30%. Furthermore, almost all students surveyed (94%) reported that the contest was an effective way to get students to quit smoking and the majority (89%) felt that including incentives in a quit smoking program was a valuable way to get students to quit.

Let’s Make A Deal! Contest for Post-Secondary Students

Overall, studies have shown that contests have been widely utilized in the general community (Glasgow et al., 1985; Elder et al., 1987; King et al., 1987; Lando et al., 1990; Puska et al., 1998; McAlister et al., 2000; Hennrikus et al., 2002; Hahn et al., 2005) and have been found to produce impressive quit rates for contestants up to 1-year after the contest occurred (King et al., 1987; Lando et al., 1995; Croghan et al., 2001; Hahn et al., 2005; Hawk et al., 2006). Community-based contests tend to attract younger smokers
Contest

...and have the potential to reach a large number of smokers. These findings, combined with evidence that young adult smokers may perceive contests as an appealing assisted method of quitting (Lawrance, 2001; Hines, 1996), and that smokers who use assisted methods are more likely to quit than those who do not (Jain, 2003; Ota & Takahashi, 2005; Cummings, Fix, Celestino, Carlin-Menter, O’Connor, & Hyland, 2006), suggest that contests might be successfully implemented to promote smoking cessation among young adult smokers on university campuses. Accordingly, a campus-based motivational contest was introduced at a dozen Ontario universities. Hosted by ‘Leave The Pack Behind’ (see below for thorough description of the program), this contest encouraged registrants to quit smoking or reduce their tobacco consumption. (The latter contest goal reflects a harm reduction stance that reduced tobacco consumption is a desirable outcome among smokers who are unable or unwilling to completely abstain from smoking).

Anecdotal evidence acquired in the first years that the contest was hosted provided some evidence of success of this contest (K-A Lawrance, personal communication, November 15, 2004). It did not, however, facilitate an understanding of the long-term contest outcomes such as, relapse, cessation, reduction and other smoking behaviour changes among those who enter the contest. Furthermore, while the research reviewed here suggests that a motivational contest on campus will promote abstinence among a substantial proportion of contestants, it is still unclear whether reductions in tobacco consumption can be encouraged among those who are unable to completely abstain. As researchers have seen, community-based contests produce high quit rates for adult samples; whether the same is true for young adult smokers attending university has not
been empirically established. Along similar lines, it is not clear whether giving
contestants the option to strive toward reduced tobacco consumption (as opposed to
complete abstinence) is associated with the intended outcome of lasting reductions in (or
even elimination of) tobacco consumption.

Description of Leave The Pack Behind

In response to the need for tobacco control programming on campus (Wechsler et
al, 2001; Adlaf et al, 2003; American College Health Association, 2005), researchers and
health professionals at Brock University created Leave The Pack Behind (LTPB), a
comprehensive, multi-campus, tobacco control initiative that bridges the gap between the
need for and the delivery of smoking cessation programs and services. Consistent with
principles of comprehensive tobacco control, LTPB supports a sustained, multi-channel
communication campaign, provides uninterrupted access to numerous smoking cessation
interventions, and advocates for denormalizing the tobacco industry and its products. Its
goals are to prevent the onset of smoking during post-secondary studies; protect all
members of the campus community from the harms of environmental tobacco smoking
and smoking-related accidents and property damage; and assist current smokers to reduce
their tobacco consumption or completely abstain from smoking.

Purpose

The purpose of this study was to describe whether and how a motivational,
incentive-based smoking cessation contest assists post-secondary student smokers in
quitting or reducing their cigarette consumption. Thus, the smoking- and quitting-related
Contest

outcomes experienced by post-secondary smokers who participate in a campus-based motivational contest were monitored over the course of the study. Of particular interest were the long-term cessation outcomes experienced by two groups of contestants: those who chose to quit completely and those who chose to reduce their tobacco consumption (i.e., registrants in the ‘Quit For Good’ and ‘Keep The Count’ contest deals respectively). Characteristics of contestants who were able to quit and remain smoke free were also examined. Their feelings of self-efficacy to stay smoke free, their perceptions of how they quit and avoided relapse, and their use of aids and supports in the quitting process were explored. Similar analyses were run for those contestants who did not successfully quit smoking: specifically, their efficacy levels and smoking behaviour patterns throughout the study duration were examined.

Research Questions

Given that the goal of this study was to describe the long-term outcomes of a motivational, campus-based smoking cessation contest, the research questions address four possible outcomes contestants might experience: (1) sustained quitting (“early (sustained) quitters”: contestants have quit by 3-month follow-up and stay smoke-free at 6-month follow-up); (2) delayed quitting (“late quitters”: contestants had not quit by 3-month follow-up, but were quit for at least 7-days by 6-month follow-up); (3) continued smoking (“continuing smokers”: for the duration of the study, contestants never sustain a quit attempt longer than 7-days); and (4) relapse to smoking (“relapsers”: any time after
registration, contestants make one or more quit attempts lasting longer than 7-days but return to smoking).

**Contest Categories**

1. What are the characteristics of contestants who entered Quit For Good relative to those who entered Keep The Count?

**Contestants Who Quit**

2. What were the 3- and 6-month abstinence rates?

3. What are the characteristics of contestants who sustained a 6-month period of abstinence relative to those who did not sustain a 6-month period of abstinence?

4. How did the efficacy levels change over time for early (sustained) quitters in Quit For Good relative to early (sustained) quitters in Keep The Count?

5. How did the efficacy levels change over the follow-up periods for early (sustained) quitters relative to late quitters?

6. How did the efficacy levels change over the follow-up periods for late quitters in Quit For Good relative to late quitters in Keep The Count?

7. What are early sustained quitters’ perceptions of how they quit and what they did to cope with withdrawal?

8. What are the late quitter’s perceptions of how they quit and what they did to cope with withdrawal?
Contestants Who Do Not Quit

9. What are the barriers that prevented smokers from quitting for those in Quit For Good relative to those in Keep The Count?

10. Did continuing smokers in Quit For Good make more or less quit attempts over the course of the study than continuing smokers in Keep The Count?

11. How did the efficacy levels of continuing smokers in Quit For Good change over the follow-up periods relative to continuing smokers in Keep The Count?

12. How did the tobacco consumption of those in Quit For Good change over the follow-up periods relative to those in Keep The Count?

13. How did the tobacco consumption of continuing smokers in Quit For Good change over the follow-up periods relative to continuing smokers in Keep The Count?

14. What barriers promoted relapsers into smoking again?
METHODOLOGY

Participants

University Selection

Six of seventeen universities were selected to be included in this study. They were chosen for three reasons. First, each of the schools had been running with LTPB for at least one year and therefore were familiar with the procedures, policies and goals of LTPB. Secondly, due to time constraints, universities were selected that had ethics review boards that met frequently. Finally, previous program evaluation involving these universities suggested that students from the schools were fairly homogeneous in terms of demographics and smoking behaviour; it was hoped the generalizability of the results would be more reliable.

Ethical approval was obtained from the Ethics Boards at each of the six universities that were selected to participate in the study.

Participant Selection

Registration tables were located around each campus during National Non-Smoking Week to advertise and recruit for the ‘Let’s Make A Deal!’ contest. Participants were recruited into the contest through flyers, advertisements, and word-of-mouth. During registration, LTPB student-staff designated to work at the registration table recruited participants from among all students registering for the contest. Specifically, contestants who expressed an interest in registering for ‘Quit For Good’ or ‘Keep The Count’ were made aware by LTPB student-staff that a study of the contest was occurring. They were told what participation in the study would require, and were made aware of
confidentiality, their right to refuse involvement in the study, and incentives for participating in the study. Contestants who agreed to participate in the study were then registered accordingly.

Participants in this study were 'Let's Make A Deal' contestants who: (1) were self-reported smokers; (2) enrolled in either the 'Quit For Good' or 'Keep The Count' deals; and (3) gave informed consent to provide data for the study.

As it is common for smokers to resolve to quit at the beginning of each year and as the contest recruitment began mid-January, students were allowed to participate in the contest (and study) if they had quit earlier that same month.

Based on the numbers of contestants enrolled in the contest in previous years (i.e., 2002 and 2003), it was estimated that a minimum of 20 and a maximum of 50 participants would be recruited from each university. While the total number of participants was expected to be 140 to 200, previous patterns of registration suggested that no more than 30% of the contestants would represent Keep The Count (i.e., choose to reduce their tobacco consumption, as opposed to quitting completely).

Materials

Data collection tools are described below. In the case of questionnaires, the description also refers, by number, to the questionnaire items that comprise a specific measure.
null
Baseline Questionnaire

The baseline questionnaire is presented in Appendix A. The baseline questionnaire included measures of participants’ demographic characteristics, smoking status and behaviour, quitting intentions and behaviours, and self-efficacy to resist smoking.

Demographic data. General demographic data was obtained from all study participants. Specifically, participants were asked to indicate gender, age (in years) (#14), and current place of residence at the time of registration (with parents/guardians; in residence; or off campus (alone or with others)) (#10). Additionally, participants were asked to indicate whether their friends or roommates, significant other (i.e., date, partner, spouse), and/or members of their family (e.g., parents, siblings) smoke cigarettes (#11); and how often the people they live with smoke (not at all; from time to time; regularly) (#12).

Smoking status and behaviour. Smoking status – regular or occasional - was assessed in the standard manner: participants were asked whether they had smoked 100 or more cigarettes their whole life (#1); how often they had smoked a cigarette, even a puff, in the past month (every day or almost every day; on some days each week; once or twice all together; or not at all) (#4); and how many cigarettes they smoked on the days they did smoke in the past month (a few puffs or less; 1-5 cigarettes a day; 6-10 cigarettes a day; more than 10 cigarettes a day) (#5). Smoking status was also measured based on self-perception: whether they considered themselves to be a non-smoker who never smokes; a non-smoker who smokes sometimes; a light smoker; a regular smoker; a heavy smoker; or an ex-smoker who has totally quit smoking (#8).
Current tobacco consumption was measured by asking participants how many cigarettes they smoked in the past week (#2). Finally, level of nicotine addiction was estimated from the widely-used single-item measure: how soon after they wake up do they smoke their first cigarette (within 5 minutes; within 6-30 minutes; within 31-60 minutes; after more than an hour) (#3) (Fagerstrom, Heatherton, Kozlowski, 1990).

*Quitting behaviours.* Participants were asked if they had tried to quit smoking in the past month (yes or no) (#6). Finally, participants indicated from a list of options all the smoking cessation aids or methods they had used within the past week (#9).

*Self-efficacy to resist smoking.* Participants were asked how confident they were at the current time that they could resist temptations to smoke under four conditions: when they were experiencing a craving, during times of stress, while partying with friends, and when offered a cigarette (#13). They respond to each item on a 7-point Likert scale, where 1 represents ‘not at all sure’ they could resist the temptation and 7 represents ‘completely sure’ they could resist the temptation. Scores for the four items were averaged to produce a final score between 1 and 7, with higher scores indicating greater self-efficacy to resist smoking.

*Intervention Check*

Four weeks after registration occurred, LTPB student-staff contacted all contestants (regardless of whether they were involved in the contest study or not) by telephone for a brief intervention check. The purpose of this intervention check was a general support call, however, student-staff also had a brief conversation with participants about adherence. As Keep the Count contestants only had to adhere to their
deal for four-weeks (as opposed to eight-weeks for those in Quit For Good), follow-up was also conducted to determine the number of participants who would be entered into the final draw for the contest prize (i.e. those who successfully reduced their tobacco consumption by 50%).

To assess contestants' adherence to their contest agreement, the following questions were asked: *It's been a month since you entered the contest. Since that time, has your smoking stayed the same ... increased ... or decreased* (#1). Of importance for those in the 'Keep The Count' category was to verify that they have been adhering to the requirement that they reduce their smoking by half. Therefore, those in this category were asked: *how many cigarettes did you smoke last week* (#4). The script for the intervention check can be found in Appendix B.

**3-Month Follow-Up Interview**

During the first follow-up, 3-months after registration, participants were asked about their current smoking behaviours, current quitting status, quitting behaviours, and self-efficacy (see Appendix C).

*Smoking behaviour.* To assess current tobacco consumption, all participants were asked to indicate how their smoking behaviour had changed in the past 3-months (i.e. increased, decreased, same, or pretty-much stopped) (#1).

*Quitting status.* To determine the quitting status of each participant, both 7-day point prevalence and 30-day continuous abstinence measures were used. Thus, participants were asked whether they had smoked a cigarette, even a puff in the past seven days (#3). Participants who had not smoked at all in the past week were asked
whether they smoked a cigarette, even a puff, in the past 30 days (#3). All participants who reported being completely smoke-free for at least 7-days were also asked how many days ago they had quit (#4), what methods they had used to quit smoking and how they had dealt with withdrawal (#7). Participants who had quit for at least 7-days but had had a cigarette or a few puffs of a cigarette within the last 30-days were asked about the situations when smoking those cigarettes occurred (#5 & #6).

**Quitting behaviours.** Questions regarding quitting behaviours over the past 3-months were asked to those participants who had not been completely smoke-free for the past 7-days at follow-up. Specifically, they were asked whether or not they had tried to quit smoking within this time period (#9). If participants said they had tried to quit smoking within the past 3-months, they were asked how many times they had attempted to quit (#10), how long their longest quit attempt lasted (#11), the length of their most recent quit attempt (#12), and reasons for starting again (#13). Participants were also asked about their currently weekly tobacco consumption (#14).

**Self-efficacy to resist smoking.** All participants, regardless of their current smoking status, were asked to rate (using a 7-point Likert scale) their ability to resist smoking during four situations; when experiencing a craving, feeling stressed, partying with friends, and when offered a cigarette (#8 for quitters and #16 for continuing smokers).

**6-Month Follow-up Interview**

The same interview schedule used for the 3-month follow-up was used for the 6-month follow-up (see Appendix D).
Procedures

Contest Deals. All universities ran the same contest using the same procedures for registering and supporting contestants and determining winners. Registration for the ‘Let’s Make A Deal!’ contest was held for three consecutive days in mid-January in conjunction with National Non-Smoking Week. Contestants could enter one of four different deals: (1) ‘Quit For Good’ (completely abstain from smoking for a minimum duration of eight consecutive weeks to be eligible for a cash prize of approximately $500); (2) ‘Keep The Count’ (reduce smoking consumption by 50% for four consecutive weeks to be eligible for a prize valued at $75-$100); (3) ‘Party Without the Pack’ (abstain from smoking when drinking alcohol for four consecutive weeks to be eligible for a prize valued at $75-$100); and (4) ‘Don’t Start and Win’ (remain smoke-free for four consecutive weeks to be eligible for a prize valued at $25-$50). To enter the contest, students decided which deal they would prefer to enter and the LTPB student-staff assisted them with the registration procedures (i.e., filling out the registration form and completing the carbon monoxide test).

Contest interventions. All Quit For Good and Keep The Count participants received a package of materials upon entering the contest, and at least one support phone call (i.e. intervention check) within the first 4 weeks of registering. The package of materials contained a two-booklet self-help program, Smoke|Quit. The first booklet is for precontemplative smokers (those who have no intention of changing a certain behaviour (i.e., quitting smoking) in the near future (Prochaska, DiClemente & Norcross, 1992)). It offers readers a tongue in cheek view of smoking, and encourages them to re-evaluate the
desirability of their own smoking behaviour. Issues of concern to young adults are addressed: effects of cigarette production/smoking on the environment, smoking and the hospitality industry, smoke-free public places, and so on. The booklet contains limited text and simple visualization exercises (Appendix E). The second booklet is designed for smokers who are contemplating quitting, or actually preparing or trying to quit and stay smoke free. Smokers in contemplation are provided with information about so-called light and mild cigarettes, encouraged to consider immediate and long-term health risks of smoking, and guided to weigh the pros and cons of smoking and quitting. Those who are preparing or trying to quit are offered information about various quit methods, reminded of the importance of social support and behavioural strategies for successful quitting, and guided through the quitting process by means of a 3-day quit plan. Relapse prevention information, exercise and diet information, and techniques for dealing with stress are also presented to help quitters stay smoke-free. All information and exercises are aimed very specifically at post-secondary students, and the issues they face.

The support phone call(s) reiterated the information in the books. The primary goal was to offer peer support matched to the smoker's stage of change. Accordingly, the Peer Educator completed the standard LTPB counselling protocol.

*Prize draw.* At the end of the contest interval, prizes were awarded by drawing three contestant names for each of the four contest deals, verifying these contestants' adherence to their particular deal (through witnesses' attestations, and through urine cotinine testing in the case of Quit For Good contestants), then entering qualifying contestants in a final prize draw for their deal.
Baseline Procedures

As they registered for the 'Let's Make A Deal!' contest (i.e. after they had selected the deal, but before they had completed the registration form), individuals entering the 'Quit For Good' and the 'Keep The Count' deals were informed verbally and in writing, that a study was being done to assess the long-term outcomes of the contest (the script and print information for obtaining informed consent are presented in Appendix F). Smokers who declined participation in the study were thanked and offered encouragement to complete their contest deal; contestants who wanted to be in the study completed a research consent form. Having completed the consent form, these contestants filled out a short research questionnaire and completed all contest registration procedures as usual. On the registration form, participants ensured that their permanent mailing address and phone number(s) were stated (to be used for the 6-month follow-up in cases where they could not be reached at their local phone number(s)). They also had their registration form signed by two colleagues – a ‘Witness’ and a non-smoking ‘Buddy’ for the Quit For Good deal, or two Witnesses for the other deals. The Witnesses confirmed the registrant’s smoking status and agreed to contact the contestant once a week to fill out report forms about the contestant’s smoking behaviours. The Buddy fulfilled the same role as a Witness, but also offered support to the contestant who was trying to quit for good.

Participants submitted their signed consent form, contest registration form, and coded questionnaire to the LTPB student-staff member who immediately placed these documents into separate unmarked envelopes that were kept behind the registration table. Each day, upon conclusion of the contest registration period, the envelopes
Contest Registration Forms, baseline questionnaires, and consent forms were delivered to the LTPB campus office and placed into a locked filing cabinet. Later that day, a trained LTPB student-staff member retrieved the envelopes and processed the forms as follows.

Using information from the registration materials and baseline questionnaire, the participant's name, telephone number(s), readiness to quit, and weekly tobacco consumption was copied onto a 'Participant Tracking Form' (see Appendix G). This information was needed for the proactive support call that the Peer Educator made to the participant. The newly-completed Participant Tracking Form was placed into a file folder and secured in a locked filing cabinet in the LTPB campus office; the Contest Registration Forms and research consent forms were sealed in separate envelopes and filed in locked filing cabinets; and the questionnaires were sealed in unmarked business envelopes, then packaged into a large envelope (labelled with the campus name), and mailed/delivered to the researchers at Brock University. The Brock researchers entered data from the anonymous baseline questionnaires into a computer spreadsheet, and then stored the questionnaires in a locked filing cabinet in the LTPB research office.

3-Month Follow-up

'Leave The Pack Behind' student-staff at each university began contacting participants for the 3-month follow-up interview in mid-March 2004. To do so, student-

---

1 Contest Registration Forms remained locked up unless a participant could not be reached at the phone numbers listed on his/her Participant Tracking Form or obtained in earlier follow-up calls. In those cases, that participant's Contest Registration Form was retrieved from the file, and the more complete contact information provided on it was used in attempts to contact the participant. Any Contest Registration Form retrieved in this way was always re-sealed in the envelope, and the envelope re-filed in the secure cabinet after use. It was intended that the 3- and 6-month contact with participants would keep their Participant Tracking Forms up to date so that retrieval of the Contest Registration Forms was never needed.
Contest

staff retrieved the Participant Tracking Forms from the locked filing cabinet and used the phone number(s) recorded on the forms to call the participants. Peer Educators commenced the phone call by introducing themselves, reminding participants of the contest study, and asking for participants' consent to continue with the follow-up interview. After securing participants’ verbal consent to continue with the study, the 5-10 minute interview was administered. Participants’ answers to the interview questions were written on data collection forms that were marked with a unique identifier code. To end the phone call, the student-staff thanked respondents for their participation, asked them to verify their permanent address, and which phone number(s) would be most appropriate to use for the 6-month follow-up. Any updates to telephone numbers were written directly on the existing Participant Tracking Form for that participant. The student-staff also reminded participants to pick up a $2 Tim Hortons gift certificate\(^2\) and debriefing information at the LTPB campus office during regular business hours (or have these materials mailed to them). Finally, the student-staff thanked respondents for their continued participation in the study.

To maximize retention of participants, student-staff made multiple attempts to contact each participant. Specifically, student-staff called participants twice a day (at different times of the day) for five consecutive days. In cases where an answering machine/service was reached, the student-staff member would simply hang up. In cases where another person answered the phone and indicated that the participant was not

\(^2\) Participants received this gift certificate whether or not they actually completed the 3-month telephone interview. This form/value of incentive was selected because: most campuses have a Tim Hortons on site or nearby; students enjoy bringing a coffee/snack to early morning and late night classes; most Tim Hortons stores are smoke free; the gift certificate cannot be cashed in to buy cigarettes; and the $2 value is sufficient for a variety of menu items.
available, the student-staff member stated that she/he would call back at another time. No name or reason for calling was ever left. In cases where participants were reached, they were asked whether it was a suitable time for the interview; if not, the call was rescheduled at a participant's request. If a participant was not successfully contacted with these repeated attempts, the Contest Registration Form was examined to determine whether an alternate phone number was available; if so, the calling procedure (i.e., twice a day at different times of the day) was repeated for the alternate phone number. If the participant was still not reached, an email was sent to the email account(s) listed on the participant's Contest Registration Form. The email asked participants to call the LTPB office (to complete a telephone interview with student-staff), or to respond electronically indicating when and where an LTPB student-staff member could reach them for a telephone interview. Finally, if, after 48 hours, no electronic or telephone response had been received in response to the email, a package was sent to the permanent address of the participant. Inside the package was a sealed envelope marked only with the participant's name. A generic cover letter included in the package requested that the envelope be directed, unopened, to the participant. The envelope contained an information letter reminding the participant of the contest study, a questionnaire version of the interview that would have been administered over the phone if the participant had been contacted, a postage-paid return envelope in which the participant could return the questionnaire, a $2 Tim Horton's gift certificate, and a debriefing information sheet. Participants wishing to continue in the study were asked to complete and return the questionnaire in the postage-paid envelope provided.
6-Month Follow-Up

One research assistant completed all 6-month follow-up calls. Because 6-month follow-up calls occurred in the summer, there were no LTPB student-staff members available to assist with these calls. Follow-up calls began in June 2004 and continued until August 2004. The same procedure used for the 3-month follow-up was used for the 6-month follow-up, however the token incentive available to participants at 6-months was a $5 movie pass.\(^3\)

Due to lower than expected registration rates and high attrition rates attributable almost exclusively to difficulty reaching participants, it was decided to cancel the final 1-year follow-up call which would have occurred in January 2005.

Ensuring Participants’ Confidentiality

Because telephone interviews were used to collect data, participants were not anonymous to the student-staff who called them. Student-staff protected the confidentiality of participants and their data as follows. At baseline, a code number was assigned to each participant. At each of the telephone follow-up interviews, participants’ responses were written on data collection forms marked only with the participant’s assigned code number. (The code number was recorded on the ‘Participant Tracking Form’ and copied to the data collection form in preparation for the call). Immediately upon completing a phone call, the Peer Educator sealed the participant’s anonymous coded data collection form in an unmarked business envelope, placed that envelope into a

\(^3\) Participants received the gift certificate whether or not they actually completed the 6-month telephone interview. This form/value of incentive was selected because: most students enjoy going to the movies; movie theatres are smoke-free; a gift certificate cannot be cashed in to buy cigarettes; and the $5 value is sufficient for “cheap night” movies in most cities.
larger envelope (labelled with the campus name), then locked it in a cabinet. Every few days, the larger envelope was mailed/delivered to the researchers. Thus, all materials received by the researchers were marked only with a code number; researchers never had access to participants' names.

When participants were not reached for their follow-up telephone interview, but completed a mailed-out questionnaire instead, the anonymous, coded questionnaire came back to the Peer Educator who transferred all information from it to a data collection form marked only with the participant's identifier code. This data collection form was mailed/delivered to the researchers at Brock University (the original questionnaire was shredded).
DATA ANALYSES

Entry and Data Screening

Data were analysed using SPSS Version 13.0. After the data were entered, the researcher checked for input errors and assessed statistical assumptions. Frequencies were run in order to determine if there were any key punch errors. Mean, skewness, kurtosis, and standard deviations were calculated for all continuous variables in order to determine if the data were normally distributed. It was determined that data for tobacco consumption (number of cigarettes smoked in the past week) were highly positively skewed. Accordingly, analyses of this variable were conducted using nonparametric statistical tests. In the case of two-group comparisons (e.g., comparing the tobacco consumption of Quit For Good and Keep The Count participants), a Mann-Whitney U-test was used. The U-test is the nonparametric equivalent of the t-test and assesses whether two independent samples represent a single population. In the case of three-group comparisons (e.g., comparing the tobacco consumption of participants classified as early (sustained) quitters, late quitters, and continuing smokers), a Kruskal-Wallis test was used.

Analyses of Contestants’ Behaviours

Because the final sample was smaller than expected, some of the proposed statistical analyses could not be performed. The smaller number of participants in the contest deals also contributed to limitations in statistical power of some analyses. Accordingly, proposed analyses and reasons for modifying them are presented in Appendix G, and concerns related to power are noted in the analyses.
The focus of the analyses presented here is on describing the smoking behaviours and patterns of participants who entered the two contest deals and who quit or did not quit smoking. For all analyses, alpha was set at .05. Unless otherwise indicated, assumptions of the statistical test are satisfied by the data.

For the current analyses, the sample is first described in terms of gender, average age, smoking status (occasional or regular), weekly tobacco consumption, and living arrangements.

Second, to address research questions related to baseline characteristics of contestants who entered Quit For Good relative to those who entered Keep The Count, chi-square analyses are used where the independent variable is nominal (e.g., gender, self-reported smoking status). T-tests are used where the independent variable is interval (e.g., efficacy, and age).

Third, 3- and 6-month outcomes associated with the two deals are described and compared. Specifically, the proportion of contestants from each deal who quit, continued smoking or relapsed are compared using a chi-square test. Patterns of smoking/ quitting/ relapse are also described. Where sample sizes were sufficient, inferential statistics are used to compare quit groups. For example, a chi-square test is used to determine whether sustained abstinence, relapse, and continued smoking are related to deal. Likewise, baseline characteristics of participants who quit, relapsed, or continued smoking are compared using chi-square analyses where the dependent variable is nominal, and one-way ANOVA where the independent variable is interval.

Fourth, descriptive analyses are used to explore changes over time in participants’ self-efficacy for quitting smoking and their tobacco consumption. Mean scores for self-
efficacy and tobacco consumption at baseline, 3-month follow-up and 6-month follow-up are plotted for contestants in the two deals.

Finally, quitters' perceptions of how they quit and what they did to cope with withdrawal are examined using qualitative analyses. Similarly, Quit For Good continuing smokers' perceptions of what triggered them to resume smoking are examined using qualitative analyses. Specifically, trends in responses are described in order to find patterns of behaviour.
RESULTS

Sample Recruitment

Generation of Baseline Sample

Although research participants were recruited from six universities, anomalies in research procedures at McMaster University resulted in the exclusion of all participants from that university. During contest registration, research assistants at McMaster did not provide study materials (e.g., information page and consent form) to potential participants. When this procedural error was discovered, it was too late to recruit an adequate number of participants. Only four participants from McMaster were recruited and none of them completed the final follow-up. Therefore, McMaster was excluded from the study.

Description of Baseline Sample

One hundred and eighty seven self-identified smokers from five Ontario universities registered in the Quit For Good or Keep The Count deals of the contest. Of these, 114 participants (60.96%) agreed to participate in the study (see Table 1). Baseline characteristics of the 114 contestants who participated in the study can be found in Table 2. Those who volunteered for the contest study averaged 21.95 years of age ($SD = 4.37$) and smoked an average of 43.5 cigarettes a week ($SD = 40.80$). At baseline, participants’ overall confidence in their abilities to resist smoking in several situations was 3.92 on a 7-point scale ($SD = 1.24$).
Table 1

*Number of Contestants and Study Participants from Each University*

<table>
<thead>
<tr>
<th>University</th>
<th>Contest Registrants</th>
<th>Study Participants</th>
<th>Participation Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brock</td>
<td>57</td>
<td>43</td>
<td>75.44</td>
</tr>
<tr>
<td>Nipissing</td>
<td>10</td>
<td>10</td>
<td>100.00</td>
</tr>
<tr>
<td>Queen’s</td>
<td>27</td>
<td>14</td>
<td>51.85</td>
</tr>
<tr>
<td>Ryerson</td>
<td>65</td>
<td>31</td>
<td>47.69</td>
</tr>
<tr>
<td>Windsor</td>
<td>28</td>
<td>16</td>
<td>57.14</td>
</tr>
<tr>
<td>Characteristics</td>
<td>$N$</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>-----</td>
<td>-------</td>
<td></td>
</tr>
<tr>
<td>Contest deal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quit For Good</td>
<td>78</td>
<td>72.90</td>
<td></td>
</tr>
<tr>
<td>Keep The Count</td>
<td>29</td>
<td>27.10</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>61</td>
<td>54.00</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>52</td>
<td>46.00</td>
<td></td>
</tr>
<tr>
<td>Self-reported smoking status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-smoker who smokes sometimes</td>
<td>5</td>
<td>4.40</td>
<td></td>
</tr>
<tr>
<td>Light smoker</td>
<td>17</td>
<td>14.90</td>
<td></td>
</tr>
<tr>
<td>Regular/medium smoker</td>
<td>69</td>
<td>60.50</td>
<td></td>
</tr>
<tr>
<td>Heavy smoker</td>
<td>16</td>
<td>14.00</td>
<td></td>
</tr>
<tr>
<td>Ex-smoker who has totally quit</td>
<td>7</td>
<td>6.10</td>
<td></td>
</tr>
<tr>
<td>How soon after waking first cigarette is smoked</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within 5 minutes</td>
<td>16</td>
<td>14.00</td>
<td></td>
</tr>
<tr>
<td>Within 6-30 minutes</td>
<td>38</td>
<td>33.30</td>
<td></td>
</tr>
<tr>
<td>Within 31-60 minutes</td>
<td>32</td>
<td>28.10</td>
<td></td>
</tr>
<tr>
<td>After more than 1 hour</td>
<td>28</td>
<td>24.60</td>
<td></td>
</tr>
<tr>
<td>Tried to quit in past month (yes)</td>
<td>41</td>
<td>51.30</td>
<td></td>
</tr>
</tbody>
</table>

continued
<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Place of Residence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>With parents</td>
<td>33</td>
<td>28.90</td>
</tr>
<tr>
<td>In residence</td>
<td>27</td>
<td>23.70</td>
</tr>
<tr>
<td>Off-campus</td>
<td>54</td>
<td>47.40</td>
</tr>
<tr>
<td>How often people participant lives with smokes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at all</td>
<td>42</td>
<td>36.80</td>
</tr>
<tr>
<td>Time to time</td>
<td>22</td>
<td>19.30</td>
</tr>
<tr>
<td>Regularly</td>
<td>50</td>
<td>43.90</td>
</tr>
<tr>
<td>Friends or roommates smoke (yes)</td>
<td>106</td>
<td>93.00</td>
</tr>
<tr>
<td>Members of family smoke (yes)</td>
<td>59</td>
<td>51.80</td>
</tr>
<tr>
<td>Significant other smokes (yes)</td>
<td>33</td>
<td>28.90</td>
</tr>
</tbody>
</table>

**Final Sample**

*Generation of Final Sample*

Of the 114 participants who began the study, 74 (64.91%) completed the final follow-up assessment (see Table 3). Forty participants were lost to follow-up, and 10 participants declined to continue participating (either at the 3-month follow-up \((n = 4)\) or the 6-month follow-up \((n = 6)\)), and were removed from the sample. Table 3 shows the pattern of retention across the 3- and 6-month follow-ups.
Table 3

*Number of Participants from Each University who Completed Follow-Up Assessments*

<table>
<thead>
<tr>
<th>University</th>
<th>Baseline</th>
<th>3-month</th>
<th>6-month</th>
<th>6-month Retention Rate</th>
<th>Lost to Follow-Up</th>
<th>Withdrew from Study</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$n$</td>
<td>$n$</td>
<td>$n$</td>
<td>%</td>
<td>$n$</td>
<td>$n$</td>
</tr>
<tr>
<td>Brock</td>
<td>43</td>
<td>24</td>
<td>26</td>
<td>60.47</td>
<td>14</td>
<td>3</td>
</tr>
<tr>
<td>Nipissing</td>
<td>10</td>
<td>0</td>
<td>5</td>
<td>50.00</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Queen’s</td>
<td>14</td>
<td>14</td>
<td>9</td>
<td>64.29</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Ryerson</td>
<td>31</td>
<td>30</td>
<td>24</td>
<td>77.42</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Windsor</td>
<td>16</td>
<td>15</td>
<td>10</td>
<td>62.50</td>
<td>6</td>
<td>0</td>
</tr>
</tbody>
</table>
As shown, the final sample, therefore, included 74 participants representing 64.91% of the initial baseline sample of 114 participants.

Representativeness of Final Sample

To determine whether the final sample was representative of the initial sample, characteristics of these participants (n = 74) were compared to characteristics of participants who did not complete the 6-month follow-up (n = 22), and those who did not complete either follow-ups (n = 18). As shown in Table 4, completion of follow-ups was not related to contest deal; nor was completion of follow-ups related to self-reported smoking status, how soon after waking first cigarette is smoked (i.e., level of addiction), whether a quit attempt was recently made, living arrangements, how often housemates smoke, or whether friends, family members, or significant other smoke. Similarly, results of a Kruskal-Wallis test showed no significant differences in weekly tobacco consumption among participants who completed the study (M = 43.08; SD = 43.25), who did only the 3-month follow-up (M = 37.91; SD = 31.35), and who did neither follow-up (M = 51.83; SD = 41.53), χ² = 1.44, p = .49. Baseline efficacy scores, however, were significantly different among the three groups, F (2, 109) = 3.75, p = .03. Post hoc follow-up showed that participants who did neither follow-up had significantly (p < .05) lower baseline efficacy (M = 3.21; SD = 1.04) than participants who completed the study (M = 4.03; SD = 1.24) and those who did not complete the 6-month follow-up (M = 4.13; SD = 1.22).

Finally, although gender was related to follow-up retention (see Table 4), no significant differences in age were found across participants who completed all follow-
Table 4

Baseline Characteristics of Participants Completing 6-month, 3-month (only) or No Follow-up

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Final Sample (N = 74)</th>
<th>Did Not Complete 6-Month Follow-up (N = 22)</th>
<th>Did Not Complete Any Follow-Up (N = 18)</th>
<th>( \chi^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Contest category</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quit For Good</td>
<td>57</td>
<td>77.00</td>
<td>14</td>
<td>63.60</td>
</tr>
<tr>
<td>Keep The Count</td>
<td>17</td>
<td>23.00</td>
<td>8</td>
<td>36.40</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>37</td>
<td>50.00</td>
<td>17</td>
<td>77.30</td>
</tr>
<tr>
<td>Female</td>
<td>37</td>
<td>50.00</td>
<td>5</td>
<td>22.70</td>
</tr>
<tr>
<td>Self-reported smoking status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light smoker</td>
<td>14</td>
<td>18.90</td>
<td>5</td>
<td>22.70</td>
</tr>
<tr>
<td>Regular smoker</td>
<td>54</td>
<td>73.00</td>
<td>16</td>
<td>72.70</td>
</tr>
<tr>
<td>Ex-smoker who has totally quit</td>
<td>6</td>
<td>8.10</td>
<td>1</td>
<td>4.50</td>
</tr>
</tbody>
</table>

continued
<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Final Sample ((N = 74))</th>
<th>Did Not Complete 6-Month Follow-up ((N = 22))</th>
<th>Did Not Complete Any Follow-Up ((N = 18))</th>
<th>(\chi^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n)</td>
<td>%</td>
<td>(n)</td>
<td>%</td>
</tr>
<tr>
<td>How soon after waking first cigarette is smoked</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within 5 minutes</td>
<td>10</td>
<td>13.50</td>
<td>3</td>
<td>13.60</td>
</tr>
<tr>
<td>Within 6-30 minutes</td>
<td>26</td>
<td>35.10</td>
<td>9</td>
<td>40.90</td>
</tr>
<tr>
<td>Within 31-60 minutes</td>
<td>23</td>
<td>31.10</td>
<td>3</td>
<td>13.60</td>
</tr>
<tr>
<td>After more than 1 hour</td>
<td>15</td>
<td>20.30</td>
<td>7</td>
<td>31.80</td>
</tr>
<tr>
<td>Tried to quit in past month (yes)</td>
<td>28</td>
<td>56.00</td>
<td>8</td>
<td>50.00</td>
</tr>
<tr>
<td>Place of residence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With parents</td>
<td>26</td>
<td>35.10</td>
<td>3</td>
<td>13.60</td>
</tr>
<tr>
<td>In residence</td>
<td>14</td>
<td>18.90</td>
<td>8</td>
<td>36.40</td>
</tr>
<tr>
<td>Off-campus</td>
<td>34</td>
<td>45.90</td>
<td>11</td>
<td>50.00</td>
</tr>
</tbody>
</table>

continued
<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Final Sample (N = 74)</th>
<th>Did Not Complete 6-month Follow-up (N = 22)</th>
<th>Did Not Complete Any Follow-Up (N = 18)</th>
<th>( \chi^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( n )</td>
<td>%</td>
<td>( n )</td>
<td>%</td>
</tr>
<tr>
<td>How often people participant lives with smokes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at all</td>
<td>29</td>
<td>39.20</td>
<td>6</td>
<td>27.30</td>
</tr>
<tr>
<td>Time to time</td>
<td>15</td>
<td>20.30</td>
<td>4</td>
<td>18.20</td>
</tr>
<tr>
<td>Regularly</td>
<td>30</td>
<td>40.50</td>
<td>12</td>
<td>54.50</td>
</tr>
<tr>
<td>Friends or roommates smoke (yes)</td>
<td>69</td>
<td>93.20</td>
<td>22</td>
<td>100.0</td>
</tr>
<tr>
<td>Members of family smoke (yes)</td>
<td>34</td>
<td>45.90</td>
<td>13</td>
<td>59.10</td>
</tr>
<tr>
<td>Significant other smokes (yes)</td>
<td>23</td>
<td>31.10</td>
<td>4</td>
<td>18.20</td>
</tr>
</tbody>
</table>

* \( p = 0.04 \)
ups (\(M = 22.65, SD = 5.04\)), just the 3-month follow-up (\(M = 20.91, SD = 2.47\)) or none of the follow-ups (\(M = 20.29, SD = 2.05\)), \(F(2, 108) = 2.87, p = .06\).

The remaining analyses are based on the final sample of 74 participants who completed the 6-month follow-up\(^4\).

Characteristics of Quit For Good and Keep The Count Participants

Comparing Participants

Demographic characteristics. Quit For Good participants and Keep The Count participants were compared in terms of gender and age. Which deal participants entered was not associated with gender, \(\chi^2(1, N = 74) = 1.91, p = .17\). Males and females were exactly equally represented in the sample. The average age of participants in Quit For Good and Keep The Count did not differ significantly, \(t(70) = 1.38, p = .17\). Overall, participants were 22.65 years old (\(SD = 5.04\)).

Smoking behaviours and cognitions. Almost no differences in baseline smoking behaviours or cognitions were found for participants in the two contest deals. Chi-square analyses revealed no association between contest deal and the following variables: self-reported smoking status, \(\chi^2(4, N = 74) = 3.42, p = .49\); estimated level of nicotine addiction (based on time between waking and smoking), \(\chi^2(3, N = 74) = 0.19, p = .98\); and whether or not a quit attempt was made in the past month, \(\chi^2(1, N = 50) = 0.08, p = .78\). There was also no difference between the two groups in terms of how long participants’ most recent quit attempt had lasted, \(t(23) = 1.21, p = .24\). The average

\(^4\) Among these 74 participants, 13 did not provide 3-month follow-up data. Comparisons of participants who did (\(n = 61\)) and did not (\(n = 13\)) provide 3-month follow-up data are presented in Appendix I. The only difference observed between the two groups was that there were more participants who completed the 6-month follow-up only who lived with others who smoke on a regular basis compared to those who completed both 3- and 6-month follow-up interviews, \(\chi^2(2, N = 74) = 9.39, p = .01\).
length was 9.88 days ($SD = 13.03$). Tobacco consumption of the participants in the two deals also did not differ significantly ($U = 392.00, z = -1.20, p = .23$); on average, Quit For Good participants smoked 41.75 ($SD = 46.03$) cigarettes per week and Keep The Count participants smoked 47.53 ($SD = 33.05$) cigarettes per week.

The only difference to emerge was that participants in Quit For Good scored higher on overall efficacy to resist smoking in tempting situations ($M = 4.29, SD = 1.13$) compared to participants in Keep The Count ($M = 3.14, SD = 1.26$), $t(71) = 3.49, p = .001$.

*Environmental factors.* The social environments of participants were not associated with the contest deal participants entered. The following variables were not related to which deal participants entered: where participants lived, $\chi^2 (2, N = 74) = 1.60, p = .45$; how often the people participants live with smoke, $\chi^2 (2, N = 74) = 2.33, p = .31$; whether their friends/roommates smoke, $\chi^2 (1, N = 74) = 1.60, p = .21$; whether any of their family members smoke, $\chi^2 (1, N = 74) = 0.20, p = .65$; and whether their significant other smokes, $\chi^2 (1, N = 74) = 1.05, p = .31$.

**Contest Outcomes**

**Smoking Cessation**

*Definition and Assessment of Smoking Cessation*

Patterns of smoking cessation over the course of the study were examined.

Participants were categorized as early (sustained) quitters if they met these criteria: (i) they reported being smoke-free (based on 7-day point prevalence) at 3-month follow-up and at 6-month follow-up and (ii) their answers to additional open-ended questions
revealed that they had remained smoke-free between follow-up times. Participants were classified as late quitters if they were still smoking at 3-month follow-up, but were smoke-free (based on 7-day point prevalence) at 6-month follow-up. Continuing smokers were those who reported smoking at both 3- and 6-month follow-ups. Participants were classified as relapsers if they had been smoke-free at 3-month follow-up (based on 7-day point prevalence), but reported smoking at 6-month follow-up.

For the 13 participants who did not complete the 3-month follow-up, scores for quitting and smoking behaviours were imputed as follows. First, with respect to quitting, it was found that 3 of the 13 participants reported being smoke-free at 6-month follow-up (based on 7 day point prevalence). When asked how long this quit attempt had lasted, all 3 participants reported being smoke-free for less than 90 days. Therefore, it was concluded that all had still been smokers at 3-month follow-up and they could be categorized as late quitters. The other 10 participants reported smoking at 6-month follow-up. They were conservatively categorized as continuing smokers (although they might have been relapsers). Mean substitution was used to replace 3-month follow-up scores for all 13 participants who did not have valid scores for tobacco consumption and self-efficacy for quitting. Specifically, using data from participants who had completed the 3-month follow-up, the average weekly cigarette consumption and the mean efficacy score at 3-month follow-up were calculated separately for the two contest deals. Based on which deal the 13 participants were in, the appropriate mean was used to represent their 3-month follow-up score for weekly tobacco consumption and self-efficacy.

Cessation outcomes for the two contest deals are presented based on responses from the final sample of participants (N = 78) and using ‘intention-to-treat’ analyses.
(where participants who dropped out of the study are included and presumed to be ‘still smoking’ at both follow-up times).

*Cessation Outcomes for Each Deal*

Figure 2 presents the quitting patterns over the 6-month period for the 57 participants registered in the Quit For Good contest deal. Results related to tobacco consumption, quit attempts, and efficacy to resist smoking are presented in a later section). Of the 57 Quit For Good participants, 11 (19.30%) reported being smoke-free at both the 3- and 6-month follow-ups. To determine whether they could be classified as “early (sustained) quitters”, their smoking and quitting patterns were further examined. Of these 11 participants who had been smoke-free at both follow-ups, 9 reported at 6-month follow-up that they had quit at least 90 days ago. In fact, all of these 9 participants had been smoke-free for at least 180 days, with an average of 229.67 days smoke-free \((SD = 34.07)\). They were classified as early (sustained) quitters. The other 2 participants both reported being smoke-free for less than 90 days at 6-month follow-up \((M = 22.00, SD = 1.41)\). Further examination of these two participants’ tobacco use between the 3- and 6-month follow-up times revealed that one contestant had been smoke-free for the previous 90 days when contacted at 3-month follow-up, had been completely smoke-free for the 21 days prior to the 6-month follow-up, and mostly smoke-free before the 21-day period of abstinence. While the participant had smoked in between follow-ups, the limited and infrequent nature of this smoking would be considered “slips”. As slips are a normal part of the quitting process and this person had generally remained smoke-free for sustained periods of time, this person remained classified as an early (sustained) quitter.
Figure 2. Quitting Patterns of Quit For Good Contestants

*Further investigation of one participant’s pattern of quitting revealed that cessation achieved at the 3-month follow-up was not sustained through the 6-month follow-up (though another quit attempt had been made shortly before the 6-month assessment). This participant was re-categorized as a late quitter.*
The other participant’s smoking behaviour, however, was consistent with the pattern labeled “late quitter”. This participant had experienced significant relapses to smoking between baseline and the 6-month follow-up. The current 23-day quit attempt represented this participant’s most sustained period of smoking abstinence. Accordingly, this contestant was re-categorized as a “late quitter”. Thus, 10 Quit For Good contestants (17.54%) were identified as early (sustained) quitters.

In addition to the one participant who was re-assigned to the “late quitter” category, seven Quit For Good participants – or 14.04% in total – were categorized as “late quitters” (based on data showing them to be smoking at 3-month but not at 6-month follow-up). On average, these late quitters had been smoke-free for 24.29 days (SD = 24.87). Finally, four Quit For Good participants (7.02%) reported being smoke-free at the 3-month follow-up, but relapsing back to smoking by the 6-month follow-up; and 35 (61.40%) reported continued smoking throughout the study (i.e. at both the 3-month and 6-month follow-up times).

An intention-to-treat analyses was conducted for all contestants who entered the Quit For Good deal at baseline and agreed to participate in the study of the contest (see Figure 3). Based on this analysis, the proportion of participants successfully quitting was 23.08% (with 12.82% being categorized as early sustained quitters and 10.26% being categorized as late quitters). At 6-month follow-up the proportion of continuous smokers was 71.95%; this represents an increase of approximately 10% relative to the analysis of the final sample.
Figure 3. Quitting Patterns of Quit For Good Contestants using Intention-to-Treat Analyses

Baseline

Smoking
N = 78

3-Month Follow-Up

Smoke-Free
n = 15
(19.23%)

Number of Days Smoke-Free
M = 86.53, SD = 41.73
min = 21.00, max = 140.00

Number of Cigarettes Smoked Last Week
M = 39.49, SD = 35.10
min = 0.50, max = 140.00

6-Month Follow-Up*

Smoke-Free
n = 10
(12.82%)

Number of Days Smoke-Free
M = 208.80, SD = 73.39
min = 21.00, max = 271.00

Number of Cigarettes Smoked Last Week
M = 22.50, SD = 21.79
min = 5.00, max = 30.00

Smoking
n = 4
(5.13%)

Number of Days Smoke-Free
M = 24.12, SD = 23.03
min = 9.00, max = 80.00

Number of Cigarettes Smoked Last Week
M = 54.94, SD = 52.37
min = 0.00, max = 175.00

Smoke-Free
n = 8
(10.26%)

Number of Days Smoke-Free
M = 208.80, SD = 73.39
min = 21.00, max = 271.00

Number of Cigarettes Smoked Last Week
M = 22.50, SD = 21.79
min = 5.00, max = 30.00

Smoking
n = 56
(71.95%)

Number of Days Smoke-Free
M = 208.80, SD = 73.39
min = 21.00, max = 271.00

Number of Cigarettes Smoked Last Week
M = 22.50, SD = 21.79
min = 5.00, max = 30.00

Early (Sustained) Quitters
Relapsers
Late Quitters
Continuing Smokers

* Further investigation of one participant’s pattern of quitting revealed that cessation achieved at the 3-month follow-up was not sustained through the 6-month follow-up (though another quit attempt had been made shortly before the 6-month assessment). This participant was re-categorized as a late quitter.

† Tobacco consumption is reflective of only the 42 contestants who provided data at 3-month follow-up.

‡ Tobacco consumption is reflective of only the 35 contestants who provided data at 6-month follow-up.
Figure 4 shows the 17 Keep The Count participants’ patterns of quitting over the course of the study. Results related to tobacco consumption, quit attempts, and efficacy to resist smoking are presented in a later section.

Of the 17 participants registered for Keep The Count at baseline, one participant reported being smoke-free at both 3- and 6-month follow-ups and would have been considered an early (sustained) quitter if the second criteria of remaining smoke-free over the 6-month interval had been met. However, because this participant had been abstinent for 21 days immediately preceding both the 3- and 6-month follow-ups, this contestant’s smoking and quitting behaviour represented significant relapses in between quit attempts. This contestant was therefore re-categorized as a “late quitter”.

Three more Keep The Count participants reported smoking at the 3-month follow-up, but were smoke-free by the 6-month follow-up. Thus, 23.53% of Keep The Count participants were “late quitters”. Overall, these participants had been smoke-free for 19.67 days ($SD = 9.61$). Finally, 13 (76.47%) reported continued smoking throughout the study.

An intention-to-treat analyses was re-run including those Keep The Count participants who were lost to follow-up. As seen in Figure 5, the proportion of participants successfully quitting was 13.79% all of which are categorized as late quitters. Overall, the proportion of continuing smokers was approximately 10% higher and the proportion of late quitters was approximately 10% lower in the intention-to-treat analysis relative to the analysis based on the final sample.

As shown in Table 5, the proportion of participants in each deal who quit, relapsed or continued smoking was independent of contest deal.
Figure 4. Quitting Patterns of Keep The Count Contestants

Baseline
Smoking
\( N = 17 \)

Smoke-Free
\( n = 1 \)
(5.88%)  
Number of Days Smoke-Free  
\( M = 21.00 \)

3-Month Follow-Up

Smoking
\( n = 16 \)
(94.12%)
Number of Cigarettes Smoked Last Week
\( M = 23.61, SD = 24.02 \)
\( min = 2.00, max = 80.00 \)

6-Month Follow-Up*

Smoke-Free
\( n = 0 \)

Smoking
\( n = 0 \)

Smoke-Free
\( n = 4 \)
(23.52%)
Number of Days Smoke-Free  
\( M = 20.00, SD = 7.87 \)
\( min = 11.00, max = 30.00 \)

Smoking
\( n = 13 \)
(76.47%)
Number of Cigarettes Smoked Last Week
\( M = 37.77, SD = 42.80 \)
\( min = 1.00, max = 140.00 \)

Early (Sustained) Quitters  Relapsers  Late Quitters  Continuing Smokers

* Further investigation of one participant’s pattern of quitting revealed that cessation achieved at the 3-month follow-up was not sustained through the 6-month follow-up (though another quit attempt had been made shortly before the 6-month assessment). This participant was re-categorized as a late quitter.
**Figure 5.** Quitting Patterns of Keep The Count Contestants using Intention-to-Treat Analyses

```
<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>3-Month Follow-Up</th>
<th>6-Month Follow-Up*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking</td>
<td>N = 29</td>
<td>Smoking</td>
<td>Smoking</td>
</tr>
<tr>
<td>Smoke-Free</td>
<td>n = 1</td>
<td>Smoke-Free</td>
<td>Smoking</td>
</tr>
<tr>
<td></td>
<td>(3.45%)</td>
<td></td>
<td>n = 28</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(96.55%)</td>
</tr>
<tr>
<td>Number of Days</td>
<td>M = 21.00</td>
<td></td>
<td>Number of Cigarettes Smoked Last Week†</td>
</tr>
<tr>
<td>Smoke-Free</td>
<td></td>
<td></td>
<td>M = 23.61, SD = 24.82</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>min = 2.00, max = 80.00</td>
</tr>
<tr>
<td>Number of Cigarettes</td>
<td></td>
<td></td>
<td>Number of Cigarettes Smoked Last Week‡</td>
</tr>
<tr>
<td>Smoked Last Week†</td>
<td></td>
<td></td>
<td>M = 37.77, SD = 42.80</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>min = 3.00, max = 140.00</td>
</tr>
<tr>
<td>Smoke-Free</td>
<td>n = 0</td>
<td></td>
<td>Smoke-Free</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>n = 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(13.70%)</td>
</tr>
<tr>
<td>Number of Days</td>
<td></td>
<td></td>
<td>Number of Days</td>
</tr>
<tr>
<td>Smoke-Free</td>
<td></td>
<td></td>
<td>Smoke-Free</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>M = 20.00, SD = 7.87</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>min = 11.00, max = 30.00</td>
</tr>
<tr>
<td>Tobacco consumption is reflective of only the 16 contestants who provided data at 3-month follow-up.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Further investigation of one participant’s pattern of quitting revealed that cessation achieved at the 3-month follow-up was not sustained through the 6-month follow-up (though another quit attempt had been made shortly before the 6-month assessment). This participant was re-categorized as a late quitter.

† Tobacco consumption is reflective of only the 16 contestants who provided data at 3-month follow-up.

‡ Tobacco consumption is reflective of only the 13 contestants who provided data at 6-month follow-up.
```
### Table 5

**Quitting Patterns by Contest Deal**

<table>
<thead>
<tr>
<th>Pattern of Smoking Cessation</th>
<th>Quit For Good</th>
<th></th>
<th>Keep The Count</th>
<th></th>
<th>$\chi^2 (3, N = 74)$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$n$</td>
<td>%</td>
<td>$n$</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Early (sustained) quitters</td>
<td>10</td>
<td>17.54</td>
<td>0</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>Late quitters</td>
<td>8</td>
<td>14.04</td>
<td>4</td>
<td>23.53</td>
<td>5.36</td>
</tr>
<tr>
<td>Relapsers</td>
<td>4</td>
<td>7.02</td>
<td>0</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>Continuing smokers</td>
<td>35</td>
<td>61.40</td>
<td>13</td>
<td>76.47</td>
<td></td>
</tr>
</tbody>
</table>

### Methods of Quitting

Quitters’ 3- and 6-month responses to open-ended questions about their reported cessation methods and methods of dealing with withdrawal were examined. The majority of quitters (both early and late) reported their method of quitting as being “cold turkey”. Three of the 22 quitters reported that the contest and the incentives associated with the contest helped them to quit.

"I wanted to quit and it just so happened the contest was occurring at the same time"

"The incentives helped”.

"The contest”.

Only one contestant reported using Nicotine Replacement Therapy to help them quit.
"I used Nicorette gum a few times a week".

One contestant felt that the smoking by-laws in their municipality assisted with their quit attempt.

"The smoking laws in the bars helped".

Finally, one contestant felt that her boyfriend who recently quit helped her continue to stay motivated during her quit attempt.

"My boyfriend quit as well".

Methods of Dealing with Withdrawal

Quitters were asked how they coped with any nicotine withdrawal symptoms they experienced. Eleven of the 22 quitters did not answer the question: 8 were not asked because it was only asked of participants who had been quit for longer than 30 days; and the other three quitters answered the question about cessation method but failed to answer the question related to withdrawal symptoms.

The methods used by quitters to deal with withdrawal are presented in Table 6. Most participants did experience withdrawal symptoms during their quit attempts. The most common methods to deal with withdrawal were to use social support, behavioural substitution, and distraction. Most quitters used more than one coping mechanism.

Comparing Quitters to Continuing Smokers

Analyses were conducted to explore whether and how quitters differed from continuing smokers. Quitting status (early (sustained) quitting; late quitting; continuing
### Table 6

**Methods Used By Quitters to Deal with Withdrawal**

<table>
<thead>
<tr>
<th>Method</th>
<th>Quote</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Food and/or Drink</strong></td>
<td>&quot;I ate a lot.&quot;</td>
</tr>
<tr>
<td></td>
<td>&quot;I drank lots of water. I ate sunflower seeds and brought them to the bar for times of cravings.&quot;</td>
</tr>
<tr>
<td></td>
<td>&quot;I chewed bubblegum.&quot;</td>
</tr>
<tr>
<td></td>
<td>&quot;I drank more coffee.&quot;</td>
</tr>
<tr>
<td></td>
<td>&quot;I have given up drinking as well.&quot;</td>
</tr>
<tr>
<td><strong>Distractions</strong></td>
<td>&quot;I cooked a lot.&quot;</td>
</tr>
<tr>
<td></td>
<td>&quot;I slept a lot and tried to stay busy with work.&quot;</td>
</tr>
<tr>
<td></td>
<td>&quot;I tried to keep my mind off it and took deep breaths.&quot;</td>
</tr>
<tr>
<td></td>
<td>&quot;I kept busy.&quot;</td>
</tr>
<tr>
<td></td>
<td>&quot;To keep my hands busy, I started knitting.&quot;</td>
</tr>
<tr>
<td></td>
<td>&quot;I did other things on my breaks.&quot;</td>
</tr>
<tr>
<td><strong>Social Support</strong></td>
<td>&quot;I cried and complained and depended on social support.&quot;</td>
</tr>
<tr>
<td></td>
<td>&quot;I would hang out with people who did not smoke.&quot;</td>
</tr>
<tr>
<td></td>
<td>&quot;I avoided my friends who smoke.&quot;</td>
</tr>
<tr>
<td></td>
<td>&quot;My boyfriend quit as well.&quot;</td>
</tr>
<tr>
<td></td>
<td>&quot;I eliminated social gatherings where people smoke.&quot;</td>
</tr>
<tr>
<td><strong>Self-Help Materials</strong></td>
<td>&quot;The books (Smoke</td>
</tr>
<tr>
<td>Method</td>
<td>Quote</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>--------------------------------------------</td>
</tr>
<tr>
<td>Physical Activity</td>
<td>&quot;I tried to be active by rollerblading and staying healthy.&quot;</td>
</tr>
<tr>
<td></td>
<td>&quot;I became more active and played Ultimate Frisbee.&quot;</td>
</tr>
<tr>
<td></td>
<td>&quot;I exercised.&quot;</td>
</tr>
<tr>
<td>Nicotine Replacement Therapy</td>
<td>&quot;The Nicorette helped.&quot;</td>
</tr>
<tr>
<td>No Withdrawal</td>
<td>&quot;I didn’t have withdrawal.&quot;</td>
</tr>
</tbody>
</table>

*Note.* Of the 11 participants providing data, 10 were early (sustained) quitters.
smoking) was not associated with gender \( \chi^2 (2, N = 70) = 0.76, p = .76 \), nor were there significant differences among the three groups for age \( F (2, 65) = 0.37, p = .70 \).

**Characteristics of Quitting**

A statistically significant association was found between quitting status and self-reported smoking status at baseline (see Table 7). Participants who were ex-smokers\(^5\) at baseline were over-represented among early (sustained) quitters, while those who were regular smokers at baseline were over-represented among continuing smokers. Quitting status was not related to baseline measures of: estimated level of nicotine addiction, \( \chi^2 (6, N = 70) = 1.90, p = .93 \); attempting to quit in past month, \( \chi^2 (2, N = 48) = 0.64, p = .73 \); place of residence, \( \chi^2 (4, N = 70) = 2.25, p = .69 \). It was marginally related to how often people the participant lives with smokes, \( \chi^2 (4, N = 70) = 9.24, p = .06 \).

Statistically significant differences in baseline levels of efficacy to resist smoking in tempting situations and in weekly tobacco consumption were observed (see Table 8). Early (sustained) quitters had the highest baseline efficacy score of the three groups, while participants who continued smoking throughout the contest had the highest weekly tobacco consumption of the three groups at baseline.

Efficacy to resist smoking was examined for early (sustained) quitters and late quitters in the two contest deals. Figure 6 shows the efficacy scores of quitters over the course of the study (note that there were no early (sustained) quitters in the Keep The

\(^5\) As it is common for smokers to resolve to quit at the beginning of each year and as the contest recruitment began mid-January, students were allowed to participate in the contest (and study) if they had quit earlier that same month.
Table 7

*Association between Self-Identified Smoking Status and Cessation Outcome*

<table>
<thead>
<tr>
<th>Self-reported smoking status</th>
<th>Early (Sustained) Quitters (n = 10)</th>
<th>Late Quitters (n = 12)</th>
<th>Continuing Smokers (n = 48)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Light smoker</td>
<td>3</td>
<td>30.00</td>
<td>7</td>
</tr>
<tr>
<td>Regular smoker</td>
<td>4</td>
<td>40.00</td>
<td>5</td>
</tr>
<tr>
<td>Ex-smoker who has totally quit</td>
<td>3</td>
<td>30.00</td>
<td>0</td>
</tr>
</tbody>
</table>

*p = .00
Table 8

Baseline Efficacy to Resist Smoking and Tobacco Consumption of Early (Sustained) Quitters, Late Quitters and Continuing Smokers

<table>
<thead>
<tr>
<th>Smoking Behaviour</th>
<th>Early (Sustained) Quitters (n = 10)</th>
<th>Late Quitters (n = 12)</th>
<th>Continuing Smokers (n = 48)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Baseline efficacy to resist smoking&lt;sup&gt;1&lt;/sup&gt;</td>
<td>4.93&lt;sup&gt;a,b&lt;/sup&gt;</td>
<td>1.25</td>
<td>3.54</td>
</tr>
<tr>
<td>Baseline weekly tobacco consumption&lt;sup&gt;2&lt;/sup&gt;</td>
<td>26.50</td>
<td>42.17</td>
<td>22.58</td>
</tr>
</tbody>
</table>

<sup>1</sup>Efficacy for resisting smoking was measured on a 7-point Likert scale with higher scores indicating greater efficacy. In each row, means with the same superscript differ significantly (p < .05). <sup>2</sup>Differences among groups were assessed using the Kruskal-Wallace test. Despite the significant overall test statistic, post-hoc tests failed to detect where the significant differences were for tobacco consumption.

* p < .05.
Figure 6. Mean Efficacy to Resist Smoking of Participants Who Quit Smoking During the Contest

Count deal). At baseline, all groups of quitters reported approximately the same confidence level, and by 3-month follow-up, all had experienced increases in efficacy. At the 6-month follow-up, late quitters from Quit For Good reported feeling as confident as they had been at 3-month follow-up, whereas late quitters from Keep The Count felt
more confident than they did at 3-month. Early sustained quitters’ 6-month efficacy scores were unchanged from the 3-month follow-up time.

Continued Tobacco Use

Tobacco Consumption

Outcomes experienced by the 35 Quit For Good and 13 Keep The Count contestants who continued smoking throughout the contest are reported here. Mean number of cigarettes smoked in the previous week was calculated for participants based on the contest deal they were in. Figure 7 illustrates the changes in smoking rates over the course of the study for continuing smokers. Given the positive skewness of the data, Wilcoxon Signed Ranks tests were used to assess changes in tobacco consumption over time. Number of cigarettes smoked per week by Quit For Good continuing smokers did not change from baseline to 6-month follow-up ($z = .15, p = .88$). Despite the apparent drop in tobacco consumption between baseline and 6-month follow-up, for continuing smokers in Keep The Count, the reduction did not reach significance ($z = 1.33, p = .18$). Finally, there was no statistically significant difference between Quit For Good and Keep The Count continuing smokers’ 6-month weekly tobacco consumption ($U=179.50, z = 1.12, p = .27$).

Efficacy to Resist Smoking and Attempts to Quit

The efficacy levels of continuing smokers from the two deals are presented in Figure 8. Those in Quit For Good experienced a maintenance of moderate levels of efficacy over time. Those in Keep The Count experienced a sharp rise in efficacy from
Figure 7. Mean Number of Cigarettes Smoked in the Past Week by Continuing Smokers

Figure 8. Efficacy to Resist Smoking for Continuing Smokers
baseline to 3-month follow-up, and then a decline that left those in Keep The Count feeling less efficacious than they felt at 3-month, but more than they felt at baseline.

*Unsuccessful Quitting*

Quit For Good and Keep The Count continuing smokers were compared according to the number of quit attempts made within the past 3 months. As seen in Figure 9, both groups had similar quit attempt patterns as both had increased their quit attempts over the course of the study.

It is assumed, based on the deal they entered, that all smokers in Quit For Good tried to quit. Therefore, among those Quit For Good contestants not categorized as early or late quitters, it could be that there were barriers that prevented them from successfully quitting and remaining smoke-free. Qualitative data were collected from 39 continuing smokers who had attempted to quit within the past 3 months. As shown in Table 9, by far the most prominent barrier to quitting among the continuing smokers was stress. Although stress resulted from a number of reasons, the primary stress in most contestants' lives was school.
Figure 9. Number of Quit Attempts Made by Continuing Smokers in Past 3 Months.
### Table 9

**Barriers Preventing Successful Quit Attempts by Continuing Smokers**

<table>
<thead>
<tr>
<th>Trigger</th>
<th>Quote</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stress</td>
<td>“Stress. I’m trying to decide what grad school offer to take and I’m having a hard time with it.”</td>
</tr>
<tr>
<td></td>
<td>“I’m moving and really stressed”</td>
</tr>
<tr>
<td></td>
<td>“Mainly school stress. I’m doing my thesis”</td>
</tr>
<tr>
<td></td>
<td>“I started a new job so I started to feel kinda stressed and started smoking”</td>
</tr>
<tr>
<td></td>
<td>“Mental stress. Due to an accident I can’t work so I started smoking again”</td>
</tr>
<tr>
<td></td>
<td>“Stress”</td>
</tr>
<tr>
<td></td>
<td>“Stress”</td>
</tr>
<tr>
<td></td>
<td>“Overload of school. I felt burdened so I need to start smoking again”</td>
</tr>
<tr>
<td></td>
<td>“Stress from work and my relationship with my boyfriend. Stress from my family relationships”</td>
</tr>
<tr>
<td></td>
<td>“Exams and stress”</td>
</tr>
<tr>
<td></td>
<td>“Stress. When anything goes bad”</td>
</tr>
<tr>
<td></td>
<td>“Stress of school”</td>
</tr>
<tr>
<td></td>
<td>“Stress and exams”</td>
</tr>
<tr>
<td></td>
<td>“Stress, exams and being upset”</td>
</tr>
<tr>
<td></td>
<td>“Stress”</td>
</tr>
<tr>
<td></td>
<td>“Stress”</td>
</tr>
<tr>
<td></td>
<td>“Stress and pain”</td>
</tr>
<tr>
<td></td>
<td>“Stress, exams and projects”</td>
</tr>
<tr>
<td>Trigger</td>
<td>Quote</td>
</tr>
<tr>
<td>---------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Social Events</td>
<td>“Parties and school.”</td>
</tr>
<tr>
<td></td>
<td>“Partying.”</td>
</tr>
<tr>
<td></td>
<td>“Bars – going out drinking.”</td>
</tr>
<tr>
<td></td>
<td>“Alcohol.”</td>
</tr>
<tr>
<td>Social Influences</td>
<td>“It’s a social thing when I’m with people who have cigarettes. My goal was to stop buying them and I’ve done that since January.”</td>
</tr>
<tr>
<td></td>
<td>“People around me smoke so I just picked it up again. Especially at work since there’s a designated smoking room to smoke in.”</td>
</tr>
<tr>
<td></td>
<td>“I usually only smoke if I’m out partying with other smokers. Someone handed me one.”</td>
</tr>
<tr>
<td></td>
<td>“When I’m with a friend who smokes.”</td>
</tr>
<tr>
<td></td>
<td>“My boyfriend smokes a lot, so I smoke when I’m around him.”</td>
</tr>
<tr>
<td></td>
<td>“Everyone around me smokes. I feel it passes the time quicker.”</td>
</tr>
<tr>
<td></td>
<td>“I didn’t feel supported by Leave The Pack Behind.”</td>
</tr>
<tr>
<td></td>
<td>“Going out with friends.”</td>
</tr>
<tr>
<td></td>
<td>“I went out with friends who smoke and had a smoke. I smoke just socially now.”</td>
</tr>
<tr>
<td></td>
<td>“The social aspect.”</td>
</tr>
<tr>
<td></td>
<td>“Opportunities and friends who smoke. It’s not too bad for me if I only smoke a few.”</td>
</tr>
<tr>
<td></td>
<td>“Seeing other people smoke.”</td>
</tr>
<tr>
<td>Trigger</td>
<td>Quote</td>
</tr>
<tr>
<td>-------------</td>
<td>-----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Craving</td>
<td>“A craving made me smoke”.</td>
</tr>
<tr>
<td></td>
<td>“Craving”.</td>
</tr>
<tr>
<td></td>
<td>“Found I couldn’t have coffee or beer without craving a cigarette, so I started smoking again”.</td>
</tr>
<tr>
<td></td>
<td>“I wanted to”.</td>
</tr>
<tr>
<td></td>
<td>“I found a pack of cigarettes and gave into temptation”.</td>
</tr>
<tr>
<td></td>
<td>“Cravings”.</td>
</tr>
<tr>
<td>Mood</td>
<td>“Boredom”.</td>
</tr>
<tr>
<td></td>
<td>“I enjoy smoking”.</td>
</tr>
<tr>
<td>Environment</td>
<td>“I went to Europe and smoking began during that trip”.</td>
</tr>
<tr>
<td></td>
<td>“Being on vacation”.</td>
</tr>
<tr>
<td></td>
<td>“Being back at school and in a smoking environment”.</td>
</tr>
<tr>
<td></td>
<td>“Spring break”.</td>
</tr>
<tr>
<td>Associations</td>
<td>“Smoking has become a part of my routine. It’s integrated in my daily life so it’s hard to break from”.</td>
</tr>
<tr>
<td></td>
<td>“Not having one after I eat”.</td>
</tr>
</tbody>
</table>

Note: 9 continuing smokers did not provide an answer.
DISCUSSION

The purpose of this study was to describe whether and how a motivational, incentive-based smoking cessation contest assists post-secondary student smokers in quitting or reducing their cigarette consumption. Participants entering the Quit For Good and the Keep The Count deals of the 'Let's Make A Deal!' contest provided baseline, 3-month and 6-month follow-up data about their smoking and quitting behaviours and cognitions.

Contest Outcomes

Smoking Cessation Outcomes

Cessation outcomes were examined using both intention-to-treat and the data provided at follow-up. Intention-to-treat outcomes revealed that 12.82% of Quit For Good contestants were early (sustained) quitters and another 10.26% were late quitters resulting in an overall quit rate of 23.08%. Keep The Count contestants had an overall quit rate of 13.79% based on the intention-to-treat analyses.

When analyses were based on the final sample (excluding participants who dropped out of the study), it was observed that 10 (13.51%) of the 74 contestants quit immediately and remained smoke-free throughout the 6-month study period, regardless of which deal they entered. Another 12 contestants (16.22%) did not quit initially (i.e., they were still smoking at the 3-month follow-up), but eventually quit and had been smoke-free for 3 weeks at the 6-month follow-up. The rest of the 74 contestants either continued to smoke or made a quit attempt that lasted longer than seven days then relapsed to smoking. Overall, the cessation rates found for this campus-based
motivational contest mirror the findings of the only other study to review a contest on post-secondary campuses (Rooney et al., 2005). In that study, a 12% sustained quit rate over the 6-month period following the contest registration was observed (Rooney et al., 2005). When interpreting the results of this study, it is important to remember that not all of the 74 participants who completed the 6-month follow-up had entered the Quit For Good category; just over one-quarter entered Keep The Count, implying they had no intentions of quitting. Furthermore, while the quit rate in the current study (and in the study by Rooney et al., 2005) is lower than the quit rates observed for contests in the general community (Lando et al., 1990; Koffman et al., 1998), they are higher than the average 5-7% cessation rates found in the general public (Baillie et al., 1995). Even when intention-to-treat analyses was used, the quit rates remained higher than spontaneous, unassisted quitting.

All of the participants who were successful at quitting and remaining smoke-free throughout the 6-month follow-up interval were registered in the Quit For Good Deal. (Likewise, all of the quitters who experienced relapse after a smoke-free period of 7 or more days were from the Quit For Good deal). On the other hand, quitters who made a quit attempt later in the contest and had been smoke-free for approximately 3 weeks at the 6-month follow-up were divided among Quit For Good and Keep The Count contestants. Among the Quit For Good contestants, 17.54% quit through the entire contest and 12.28% experienced a delay in quitting, but eventually quit. Therefore, 29.82% of Quit For Good participants eventually quit. Among the Keep The Count contestants, none quit immediately but 23.53% eventually did so. Thus, it would appear
that contestants in the Quit For Good deal were more successful at quitting and remaining smoke-free than those in the Keep The Count deal.

It is not surprising that Quit For Good produced the greater proportion of quitters. After all, the goal of the Keep The Count deal was not cessation, but rather harm reduction, and smokers choosing this deal were not “signed up” to quit. That being said, it is important to note that a significant number of Keep The Count contestants did end up quitting. This illustrates that harm reduction strategies can be a step to cessation and this option may have helped some smokers quit who were not originally considering quitting. Overall then it would seem that the contest supported quitting, even for those who originally did not set out to do so.

It is interesting to note that the cessation methods used by quitters within the contest widely differed. Most contestants reported going “cold turkey” and only a few participants reported using cessation interventions such as nicotine replacement therapy and social support. On the one hand, this is not surprising as previous research has shown the preference of student smokers as being unassisted (Gillespie et al., 1995; Hines, 1996; DeBernardo et al., 1999; Lawrance 2001). On the other hand, it is surprising that despite being in a contest with numerous supports available (i.e., access to LTPB, NRTs, clinicians, non-smoking “Buddies”) only three participants specifically related their quit to the contest. In a study of a quit and win contest in a low-income population, Hahn, Rayens, Chirila, Riker, Paul and Warnick (2004) similarly found that contestants did not use any of the assisted methods, such as a website or a quit line, that were provided with the contest. Furthermore, Hahn et al. (2004) also found that among low-income smokers entering a smoking cessation contest, the monetary incentive was not perceived by
contestants as an important contest element. Ramsay and Hoffman (2004) also offered incentives to undergraduate student smoker who participated in their study of a peer-led cessation program, such as a free pass to the campus fitness center and personal training. Despite participants reporting the incentives to be the motivating factor in quitting, few participants actually used the incentives. In the current study, only one participant specifically reported the incentives associated with the 'Let's Make A Deal!' contest were the critical motivator for their quit attempt. Therefore, which aspects of the contest supported student smokers to change their smoking behaviours remain unclear.

In reference to their successful quitting, all but one participant reported experiencing withdrawal symptoms. Similar to the method of cessation, the coping methods to deal with withdrawal varied widely and included methods such as reliance on social support, distraction and use of NRT. Although the contest included numerous supports for quitting, sustaining abstinence, and dealing with withdrawal symptoms, most contestants appeared to rely on their own initiative and resourcefulness when coping with withdrawal. This may suggest that students were unsure how to deal with the withdrawal symptoms they experienced.

Participants' success at quitting smoking was not only associated with which contest deal they entered, but also with their baseline levels of self-efficacy to resist temptations to smoke. Those who entered Quit For Good had a higher overall self-efficacy to resist temptations to smoke, including craving a cigarette, when partying, when offered a cigarette, and when stressed compared to those in Keep The Count.

Given that all early sustained quitters were registered in Quit For Good, it seems likely that these contestants already had intentions of quitting and the contest reinforced
these intentions and assisted in moving these intentions into action. This is consistent with conclusions of Ott et al. (2005) and Hahn et al. (2004) who found that smokers who entered a cessation contest had previous intentions to quit. It is also highlighted by a statement by one of the early sustained quitters who reported wanting to quit and entering the contest because it just happened to be occurring at the same time. This is also consistent with previous research that shows that higher efficacy is a key to quit success (Stuart et al., 1994; Gulliver et al., 1995; Shiffman et al., 2000).

Although Keep The Count contestants’ efficacy levels were not as high at baseline as those in Quit For Good, their efficacy did increase over the course of the study period. Furthermore, Keep The Count contestants’ efficacy levels had an inverse relationship with level of tobacco consumption. At the 3-month follow-up, continuing smokers in the Keep The Count deal reported both a lower level of tobacco consumption and a higher level of efficacy to resist smoking temptations. At 6-month follow-up, their tobacco consumption levels had increased somewhat, and their efficacy level had decreased somewhat.

What these finding suggest is that the contest supported in increasing efficacy levels, particularly among smokers entering the Keep The Count deal. By challenging those in Keep The Count to reduce their tobacco consumption, the contest may have helped increase their efficacy to resist smoking in tempting situations.

Harm Reduction Outcomes

Despite a satisfactory rate of quit success in both the Quit For Good and Keep The Count contest deals, the majority of participants made no quit attempts that lasted
longer than seven days. Among these continuing smokers, however, evidence of harm reduction was observed – particularly for those in Keep The Count. Specifically, Keep The Count contestants reported halving their tobacco consumption by 3-month follow-up (relative to baseline). Although they experienced an increase in consumption at 6-month follow-up, they were still smoking approximately half a pack a week less than they had been smoking at baseline. This was not the case for contestants in Quit For Good. Quit For Good contestants reported a much more modest reduction in smoking at the 3-month follow-up period, and by 6-month follow-up, those in Quit For Good reported smoking essentially the same amount that they had been smoking at baseline. The sustained reduction in tobacco use among Keep The Count but not Quit For Good contestants speaks to the value of including harm reduction goals in contests for the young adult population. While the reduction in tobacco consumption from baseline to 6-month follow-up proved not to be statistically significant, Keep The Count continuing smokers were able to reduce their weekly tobacco consumption by approximately 25%. It is important to note that efficacy levels and reductions in tobacco consumption simultaneously peaked (approximately) 3-months after baseline then moderated in the following months. Perhaps Keep The Count contestants need to be ‘re-challenged’ at this peak time to completely quit smoking. Furthermore, considering that those contestants who continued to smoke throughout the study period also continued trying to quit, it seems that the goal of harm reduction was met by offering the Keep The Count deal. Presumably, friends and family members of these smokers would experience a parallel reduction in exposure to environmental tobacco smoke (i.e. secondhand smoke). Additionally, since each cigarette takes approximately 11 minutes off a smokers’ life
(Shaw, Mitchell, & Dorling, 2000), the number of minutes of life saved by reducing 12 cigarettes per week is invaluable. Light smoking may also enhance these smokers’ likelihood of success when they do choose to quit (Katz & Singh, 1986; Glasglow et al., 1988; Cohen et al., 1989; Hennrikus et al., 1995; Zellweger, 2001; Falba et al., 2003).

Other Outcomes

Not all students registered in the Quit For Good deal were successful. Contestants who were unable to fulfill their deal (by quitting smoking) were asked what barriers to quitting or triggers to relapse they had experienced. By far, the most common obstacle impeding successful quit attempts among Quit For Good contestants was stress. Stress resulted from a number of causes, however, school stress in particular commonly triggered contestants to smoke. The influence of others and especially peers who smoke, also had a negative impact on many contestants. For example, many contestants identified social situations such as drinking alcohol and “partying” as triggers for continuing or relapsing to smoking. Stress and peer relationships have considerable impacts on student life in general, and have frequently been identified as correlates of smoking in this population (Sciacca & Melby, 1992; Naquin & Gilbert, 1996; Hudd et al., 2000; Choi et al., 2003; Lantz, 2003; Ramsay et al., 2004; Ott et al., 2005). Coupled with the scientific literature, these finding imply that the social context of smoking may impede young adults’ commitment to and success at quitting. Self-help materials provided to students at registration addressed these issues, but with little apparent influence. Only one participant reported using the self-help booklet. Likewise, social support in the form of “buddies” was integral to the contest. To what degree contestants
relied on their non-smoking “buddy” for support was not examined here. Given that many young adults have a high number of friends who smoke, and that they prefer peer-to-peer cessation and interventions (Black et al., 1993; Kishchuk et al., 2004), the role ‘buddies’ play may be vital to the contestants’ success. Indeed, given that 100% of those who entered Keep The Count had friends and/or roommates who smoke and that contestants highlighted the influence of other smokers on their difficulty quitting, the importance of the non-smoking “Buddy” should be explored further.

The results found here are encouraging and informative with respect to designing contests for young adult students. Findings that cessation methods and coping techniques varied widely and that participants experienced substantial barriers to quitting suggest that contests should help to prepare contestants for their quit. Preparation could include alerting smokers to the types of symptoms they may experience, teaching them effective ways of dealing with these, and identifying healthy ways to deal with stress.

One possible way to assist students with quitting preparations might be to have contest facilitators send regular, supportive, and informative e-mails to contestants. These e-mails could be sent immediately after registration (but prior to quitting) to assist them in preparing for their quit (i.e., remove ashtrays), dealing with withdrawal (i.e., drink water), and reminders of their support systems (i.e., their non-smoking ‘buddy’, LTPB). Ideally, the contest facilitator sending these e-mails should also be a student, thereby removing the ‘health professional’ aspect post-secondary students steer away from and including the ‘peer-to-peer’ aspect they prefer (Black et al., 1993; Gillespie et al., 1995; Hines, 1996; DeBernardo et al., 1999; Lawrance, 2001; Kishchuk et al., 2004). In their study of a peer-led smoking cessation and relapse prevention program, Ramsay et al.
Contest 101

(2004) had facilitators provide continued support through numerous means, including telephone and e-mail counseling. The effectiveness of the e-mail support messages, however, was not investigated and therefore its impact on cessation and the interest of students in receiving the messages is unknown. However, DeBernardo et al. (1999) administered a campus tobacco questionnaire to undergraduate students through their campus e-mail addresses. Within a few hours of sending the surveys out (which occurred at midnight), many students had returned the completed questionnaire. This suggests that student's access and review their emails frequently and, as a result, would have quick access to the continued supportive and informative e-mails sent during the contest period.

Specific cessation methods, such as nicotine replacement therapy, have been used in conjunction with quit smoking contests and have been shown to be effective in the general public (Hawk et al., 2006). In campus cessation contests, it may be valuable to consider offering nicotine replacement therapy as an option to enhance quit rates and ease withdrawal symptoms of contestants. However, the nicotine replacement therapy would need to be offered at low- or no-cost to the student, as research as shown that university students seem unwilling to use an assisted quit method with an accompanying cost (Hines, 1996).

Because the contest can offer only time-limited support, it is vital to develop and implement programs and policies that create an environment that discourages smoking and tobacco use, but is more conducive to cessation (and prevention). To assist students in achieving a smoke-free life, they need to be surrounded by a smoke-free environment where smoking is not perceived as the norm. Many universities and colleges across Canada are moving towards becoming smoke-free and students have shown support for
smoke-free policies on campus (Ott et al., 2005). In addition to smoke-free policies, there is still a need for policies against industry marketing on campus (Hammond et al., 2005). Together, these policies would help minimize the normative quality of tobacco use on campus. Such policies would also be consistent with the recent release of the American College Health Association’s (ACHA, 2005) position paper calling for smoking to be banned in all college campus buildings and residence halls. The report also calls for prohibiting tobacco sales, sampling and advertising on campuses, restricting smoking to at least 20 feet from all building entrances and air intake units, and offering more tobacco prevention, education and cessation programs on campuses.

If more campuses became less smoking tolerant it would provide greater sustained support to students, the more impact it may have on the cessation rates of these students. This in turn could result in higher enrolment in cessation programs, including a smoking cessation contest.

Sample Characteristics

Participants in this study were similar to those in other studies of post-secondary smokers. Thus, participants in this study were 22 years old, on average, and smoked slightly less than two packs of cigarettes per week. Almost all (93%) had friends or roommates who smoked, and just under two-thirds lived with people who smoked. For example, in their study of campus health behaviours, Ott et al. (2005) found that students smoked approximately a pack and a half per week and 96% said their four closest friends were also smokers. Wetter et al. (2004) similarly found that the majority of students who smoked daily reported that the majority of their primary friends were smokers. Tobacco
consumption of Canadian post-secondary students surveyed by Gliksman et al. (2003), were higher than those reported here, but are probably due to how data was collected. Only students who self-identified as smokers were asked to report tobacco consumption. As shown in this study (and elsewhere), many students who smoke cigarettes do not label themselves as smokers. These students tend to be much lighter smokers than those who identify themselves as smokers.

The only apparent difference between the current sample of contestants and general university samples of smokers was that contestants were a bit older. The age of the contestants suggests that those entering the contest tended to be in the later years of their educational program. The fact that most of the students enrolled in the contest were older is consistent with Ott et al. (2005) who found that most students want to quit prior to graduation. As a result, promotion of smoking cessation contests on campuses may generate greater interest (hence recruitment) if at least one promotional message of ‘smoke-free grad’ is included. In contest promotions, it may also be beneficial to pay specific attention to increasing advertising aimed at younger post-secondary students. Recruiting these students may encourage them to try to reduce or quit smoking prior to their last year in school.

Strengths and Limitations

There were a number of limitations to this study. First, students at the campuses used for this study already had a tobacco control program (LTPB) readily available on campus for at least one year. Therefore, these students were receiving more smoking cessation information and support than students at a university where no such program
was available. This may have resulted in more cessation-favourable behaviours, thereby influencing the willingness of smokers to quit or reduce their tobacco consumption. Additionally, the presence of LTPB probably created a social environment and infrastructure that supports quitting. Specific objectives of LTPB include developing awareness and cessation programs that are continuously visible and accessible by all students around campus. Again, such an environment may contribute to better outcomes among contestants. Finally, because LTPB works with administrators to create tobacco control policies which help to deflate the belief that tobacco use on campus is a normative behaviour, there may have been fewer tempting situations and triggers for smoking. The absence of smoking cues may have helped quitters maintain abstinence.

For ethical reasons, this study was not designed as a randomized controlled trial, the gold standard of methodological designs. Therefore a control group was not included. Without a control group, it is unclear whether observed outcomes were due to the contest or to factors such as the presence of LTPB on campus, the time of year the contest occurred\(^6\) (in conjunction with National Non-Smoking week and after New Years), or self-motivation to quit.

Those who did not participate in any of the follow-ups had a significantly lower overall efficacy score at baseline compared to those who completed only the 3-month follow-up and those who completed the 6-month follow-up (and therefore represented the ‘final sample’). The role their lack of efficacy played in their attrition within the study is unknown and is a limitation to this study. Considering the large impact efficacy had on

---

\(^6\) Most smoking cessation contests are held in association with tobacco-related events, such as National Non-Smoking Week (January) or World No Tobacco Day (May) (Glasgow et al., 1985; Elder et al., 1987; Puska et al., 1998; McAllister et al., 2000; Canadian Cancer Society, 2006). A control group would elucidate how much a contest elevates quit rates above the typical elevation seen during these tobacco-related events.
those who remained in the study, it is viable to consider that it may have played a role in their discontinuation.

There may also be some concerns about the tool used to evaluate self-efficacy to resist smoking. The measure used in the current study was developed through the Leave The Pack Behind program. Although it is based on theory (Bandura, 1994) and is very similar to measures used by other researchers (Etter, Bergman, Humair, & Perneger, 2000; Segan, Borland, & Greenwood, 2002; Tucker, Ellickson, & Klein, 2002; Amodei & Lamb, 2005) the validity and reliability of it are unknown.

Another potential limitation in this study was that fewer contestants were recruited into the study than expected. This influenced the type of analyses that could be done. Specifically, the relatively small sample size prohibited the option of using multivariate analyses to investigate any possible relationships among contest features, participant characteristics and cessation behaviours. For example, it would have been valuable to make multi-variate comparisons between contest deals across time in order to determine whether the Keep The Count deal yielded a greater reduction in smoking. This would have helped determine the effectiveness of the Keep The Count category as a harm reduction strategy. Furthermore, it would have been valuable to know more about what combination of variables is associated with quitting (i.e. deal, efficacy, tobacco consumption). These comparisons would have been valuable since research has already shown the impact of consumption (Katz & Singh, 1986; Glasgow et al., 1988; Cohen et al., 1989; Hennrikus et al., 1995; Zellweger, 2001; Falba et al., 2003) and efficacy (Stuart et al., 1994; Gulliver et al., 1995; Shiffman et al., 2000) on cessation, but has not examined the addition of ‘contest deal’ to the formula.
In addition to lower than expected recruitment, 35.09% of contestants who were recruited into the study were lost to follow-up. Had these contestants continued on and completed the 6-month follow-up, the results presented here may have been different. Given that participants who failed to complete the study had lower levels of self-efficacy to resist smoking, it could be that the number of quit attempts would have decreased, and the proportion of participants successfully quitting would have been lower (cf. Segan et al., 2002). In fact, the intentions to treat analyses did suggest that quit rates could have been as low as 19.30% overall. However, even when using intention-to-treat analyses, the outcomes were relatively similar and still presented favourable results.

Finally, because the contest was run in January and in conjunction with National Non-Smoking Week, contestants who had quit earlier that same month were allowed to participate in the contest as well as in the study of the contest. As it was seen, self-reported smoking status at baseline was significantly associated with quitting status at 6-month follow-up. Given that ex-smokers were overrepresented among early (sustained) quitters, it is likely that the quitting results of this study may have been less favourable had these ex-smokers not have been allowed to participate in the contest as well as in the study.

Despite these limitations, this study also has numerous strengths. The main strength of this investigation is that it is only the second study to examine a smoking cessation contest for post-secondary students. Thus, it sheds light on a viable, population-based smoking cessation intervention aimed at a large segment of the young adult cohort. Given the high prevalence of smoking in this cohort, it is important to find effective ways
to help them quit. Given the lack of literature available on this area, this study fills a gap in current knowledge of feasible smoking strategies for campuses.

In addition to promoting smoking cessation, the contest under investigation also advocated reduction of tobacco consumption. Thus a second strength of the current study is the information it provides about harm reduction. No other contest – for the general community or on campus – have offered contestants the option of reducing their tobacco consumption. As shown here, however, contestants in this contest deal sustained (at 6-month) their required reductions, experienced increases in self-efficacy to be smoke-free, or even quit smoking. This unique contest deal and the related outcomes revealed by this investigation warrant further attention.

A third strength of this study was that it was based on a sample from five separate universities across Ontario. Characteristics of the sample generated for this study were similar to other studies of post-secondary smokers (Wetter et al., 2004; Ott et al., 2005). Therefore, the results of this study would appear to be generalizable to post-secondary students.

Finally, this study used both quantitative and qualitative research methods to obtain a fuller picture of the way in which the contest influenced the behaviour of post-secondary smokers. Using a mixed-methods model for cessation research is highly recommended so that all aspects of the quitting process can be examined (Moncher, Holden, Schinke, 1991; U.S. Department of Health and Human Services, 2004; Research for International Tobacco Control, 2005).
The results of this descriptive study provide preliminary evidence pointing to a strong relationship between entering a contest and quitting or reducing smoking among university students. However, a number of important questions remain unanswered by the current study. First is whether the contest caused students to quit or reduce smoking. In the absence of a control group, it is not possible to definitively state that the contest produced the observed cessation outcomes. This is especially true for the late quitters who quit at least 3-months after registering in the contest. For these quitters, it may have been that other environmental stimuli, such as time of year (and not the contest), that prompted them to quit. The inclusion of a control group would have taken these variables into account and allowed conclusive results as to what impacted these quits.

Another question the current study was unable to answer is the role of peer influence on contestants’ quit attempts and successes. This study provided some evidence that having friends who smoke was related to entering Keep The Count rather than Quit For Good, and was possibly related to greater difficulty quitting. For example, nearly all friends of those in Quit For Good and all of the friends of those in Keep The Count smoked, thus insinuating a strong peer influence. That peers can influence quit success is apparent from previous literature (Karp, O’Loughlin, Paradis, Hanley & DiFranza, 2005; Leatherdale, Cameron, Brown, & McDonald, 2005; Leatherdale & Manske, 2005; Leatherdale, McDonald, Cameron, & Brown, 2005; Nichter et al., 2006). It is also implied from contestants’ comments that positive social support helped them to quit while lack of support triggered them to relapse or delay/avoid quitting. Finally, as part of the contest, all participants had non-smoking “buddies”. To what degree buddies helped
contestants achieve cessation goals, and whether the smoking status of the buddies influenced successful quitting was not examined. Overall, the current findings and previous research point to the need for more research into how social support in a contest is associated with contestants’ ability to quit.

In this study, the contestants seemed to be primarily upper-level students. Given this trend, it may be worth exploring whether contests have differential appeal among first, second, third and fourth year students. Having this information could help tailor the cessation contest promotions, prizes, rules and regulations to the students most likely to enter and succeed.

This study yields three key recommendations for administrators and evaluators considering running a contest on post-secondary campuses. The first recommendation is this: when running a contest on campus, administrators should consider starting the contest at the beginning of the school year (i.e. September or October). The purpose of starting the contest early is two-fold. First, because many students either begin smoking or begin smoking on a regular basis once they arrive on campus (Baranowski et al., 1997; Wechsler et al., 1998; Everett and Husten, 1999; Choi et al., 2003), having contest registration in September would allow the sponsors to recruit students who may have otherwise continued or increased their smoking behaviour. Second, for evaluators who may be interested in examining the long-term outcomes of the contest, by 6-month follow-up, contestants would still be in the school year and therefore would most likely be still in the place of residence they were during recruitment. Therefore, the attrition rates would likely be lower than those found in the current study.
This second recommendation addresses attrition in the evaluation process. It is recommended that evaluators consider offering larger incentives for continuation in the study. In the current study, incentives were only valued at up to $5. Offering a larger incentive may assist in reducing the drop-out rate by increasing the value of continuing in the study. However, to what degree the increase in incentive would influence the outcomes of the contest are unclear and therefore possible issues between offering an incentive to participate in the contest as well as incentives for continuing in the study should be taken into consideration.

The final recommendation is to carefully assess the effectiveness of a contest to promote smoking cessation among post-secondary students. Evaluators are strongly advised to conduct a study which includes a control group. In the current study, the lack of a control group prevented any conclusive inferences from being made about the effectiveness of the contest on the cessation and harm reduction outcomes observed. It was not clear whether post-secondary students were stopping or reducing smoking as a result of the contest or as a result of natural change processes experienced during young adulthood. (Late quitters, for example, may have been influenced by the contest or may be responding to the end of the school year and the associated transition to new living arrangements, social networks, job responsibilities, etc.). It is recommended that the control group be students whose demographic characteristics, smoking behaviours and interest in assisted quitting (i.e., entering a contest) are similar to students who choose to enter the contest. Thus, selection of the control group may require the evaluator to draw a sample from another post-secondary institution that is not running the contest.
Overall, the results presented here suggest that a smoking cessation contest is an appealing population-based intervention for young adult post-secondary students. The quit rates produced here are virtually identical to those reported by Rooney et al (2005). In both this study and the study by Rooney et al. (2005), quit rates were well above those observed for unassisted quitting (Baillie et al., 1995). Further research is needed to determine how to maximize the population impact of this type of intervention. In the current study, all participating schools were already involved in a larger comprehensive tobacco control initiative. Whether and how this context affected the effectiveness of the contest is unknown and should be investigated. However, as 94% of students who attempted to quit in the study by Rooney et al. (2005) reported, quitting smoking is challenging. As almost 30% of contestants were able to quit, the contest is one way to assist these smokers in their pursuit of a smoke-free life.

Conclusion

Currently, young adults still have the highest smoking prevalence of all age groups in Canada (CTUMS, 2005). A high number of these young adult smokers currently attend a post-secondary school, and despite an interest in quitting, there are few cessation programs or supports on campus to assist them in their quit attempts. In light of this gap, a smoking cessation contest on campus shows promise as a cessation intervention for post-secondary students. Current results showed that 29.82% of those who entered Quit For Good were able to quit, and many of the remaining smokers were able to reduce their tobacco consumption. Keep The Count participants were able to
reduce their tobacco consumption by more than half at the 3-month follow-up and sustain some reduction up until the 6-month follow-up. Additionally, at the 6-month follow-up, some Keep The Count participants had even quit smoking completely. These outcomes reflect positively on the use of contests as a smoking cessation (and reduction) intervention on post-secondary campuses.

It may be possible to improve the cessation and reduction outcomes of campus contests by adding a 3-month intervention. This period seems to be the peak of contestants’ self-efficacy for quitting and the lowest levels of tobacco consumption. At this point, many quitters were continuing to abstain from smoking, however some who signed up to quit were struggling with relapse. Many of those who chose to reduce their tobacco consumption were considering quitting at this point. Therefore, perhaps a “second-round” of the contest should occur at this point, where those who are either unsuccessful in their original cessation deal or building efficacy for quitting as a result of their successful reductions in consumption, are provided the opportunity to re-enter another deal. This would shift their focus to a new goal – one that is more appropriate for them at this point in their cessation endeavours - and positively reinforce their smoking behaviour changes. If a second round is not an option, tobacco control programs on campus should provide some other type of assistance to increase the chances of quitters maintaining their cessation outcomes, and continuing smokers maintaining or advancing their reduction behaviours. In this case, having Leave The Pack Behind staff contact contestants for another proactive support call may be an option. Here, staff could work with contestants to reinforce their positive behaviour changes, help identify areas of difficulty (i.e. stress, influence of other smokers), and develop strategies when faced with
these situations. This type of support would be aimed at enhancing ‘still smoking’
contestants confidence in their ability to maintain these reductions – or even to quit
smoking, and increasing quitters’ self-efficacy to resist temptations to relapse to smoking.

Overall, contests are minimally intensive, cost effective, easily accessible and
have the potential to reach a large population. Within the context of this study, the contest
itself reached a substantive number of smokers and resulted in superior quit rates
compared to unassisted quitting. By providing an option other than cessation, this contest
was able to reach a large group of smokers not ready to quit who may have otherwise
gone ignored. These smokers were able to decrease their tobacco consumption, increase
their self-efficacy, and, in some cases, eventually quit smoking completely. This suggests
that harm reduction is a viable option that may lead to quitting. Furthermore, contestants
who did not quit continued trying to quit and those that did quit experienced limited
relapses. The fact that so few experienced a relapse is encouraging considering the
minimal intensity of this intervention.
REFERENCES


Appendix A

Baseline Questionnaire
1. Have you smoked 100 or more whole cigarettes, in your life?
   □ yes □ no

2. In the past week, how many cigarettes did you smoke? [Write 0, if you didn't smoke at all]
   ________packs  OR  ________cigarettes

3. How soon after waking do you smoke your first cigarette?
   □ within 5 minutes
   □ within 6-30 minutes
   □ within 31-60 minutes
   □ after more than an hour

4. Think about the past month. How often did you smoke a cigarette, even a puff?
   □ every day, or almost every day
   □ on some days each week
   □ once or twice, all together
   □ I did not smoke at all (go to question 6)

5. Think about the past month. On the days that you smoked, how many cigarettes did you usually smoke?
   □ a few puffs, or less
   □ 1-5 cigarettes a day
   □ 6-10 cigarettes a day
   □ more than 10 cigarettes a day

6. In the past year, did you try to quit smoking?
   □ yes □ no (go to question 7)
   ▼
   Did you try to quit in the past month?
   □ yes □ no (go to question 7)
   ▼
   In the past month, how long did your most recent quit attempt last? ________ days

7. Do you plan to quit smoking in the next 6 months?
   □ yes □ no (go to question 8)
   ▼
   When do you plan to quit?
   □ within the next month
   □ more than a month from now

8. Would you consider yourself:
   □ non-smoker who never smokes
   □ non-smoker who smokes sometimes
   □ light smoker
   □ regular smoker
   □ heavy smoker
   □ ex-smoker who has totally quit smoking

9. Check all the aides you've used in the past week:
   □ nicotine patch or gum
   □ "Zyban"
   □ saw a health professional
   □ self-help program
   □ other: __________

10. Where do you live?
    □ with parents/guardians
    □ in residence
    □ off campus (alone or with others)

11. From this list, check all those people who smoke.
    □ friends or roommates
    □ significant other (i.e., date, partner, spouse)
    □ members of my family (e.g., parents, sibs)

12. How often do the people you live with smoke?
    □ not at all
    □ from time to time
    □ regularly
    □ I don't live with people

13. If you were trying to quit, how sure are you that you could resist these temptations to smoke?
    I could resist the temptation to smoke...
    
    
    |                       | not at all | not at all | not at all | not at all | not at all |
    |-----------------------|-----------|-----------|-----------|-----------|-----------|
    | when I have a craving | -1-2-3-4-5-6-7- | -1-2-3-4-5-6-7- | -1-2-3-4-5-6-7- | -1-2-3-4-5-6-7- | -1-2-3-4-5-6-7- |
    | when I am stressed    | -1-2-3-4-5-6-7- | -1-2-3-4-5-6-7- | -1-2-3-4-5-6-7- | -1-2-3-4-5-6-7- | -1-2-3-4-5-6-7- |
    | when partying with friends | -1-2-3-4-5-6-7- | -1-2-3-4-5-6-7- | -1-2-3-4-5-6-7- | -1-2-3-4-5-6-7- | -1-2-3-4-5-6-7- |
    | when offered a cigarette | -1-2-3-4-5-6-7- | -1-2-3-4-5-6-7- | -1-2-3-4-5-6-7- | -1-2-3-4-5-6-7- | -1-2-3-4-5-6-7- |

14. Age: ________ years
    Gender: □ male □ female
    Position: □ student □ staff / faculty / other
Appendix B

Intervention Script
LEAVE THE PACK BEHIND • 4wk check

CALL BACK GUIDELINES FOR LTPB STAFF MEMBER

• Introduce yourself, identifying Leave The Pack Behind. Remind the participant that she/he visited a display.

• Explain why you are calling, and ask for consent to continue using participant's answers in the study.

  NOTE: If the individual is not in the study, or consent is not given, determine answers to questions 1–5 for your own records only! (Do not complete a 4-week form for individuals not in / consenting to the study).

• Be sure you know what stage the participant was in at baseline; and begin the actual interview by asking how she/he is doing and offering a response appropriate to her/his progress or current stage using protocol on page 2.

• Continue with the interview (data collection), using the questions on pages 3 and 4.

• Obtain answers for all questions in the protocol. If you miss a question, don’t guess! Just leave it blank.

• Finish the interview by reiterating participant’s reasons to quit (or something she/he dislikes about smoking). Mention the draw. Repeat the request for consent. Answer any questions the participant has.

PROTOCOL (‘SCRIPT’) FOR INTERVIEW

Hi __________, this is __________. I’m with the Leave The Pack Behind Project at [university]. You visited our display about four weeks ago (and volunteered to be in a study of our programs.) I’m calling to find out how you’ve been doing since visiting us, and to see if you have any other smoking-related questions I can help you with.

Also __________, if it’s okay with you, I’d like to take 5 minutes at the end of the call to ask you some questions for the study. You remember that the study is looking at how useful our programs are to university students. If you agree, your answers but not your name, will be given to the researchers. That way, your answers will be confidential and your name is never linked to your answers. Of course, your participation is completely voluntary.

So, is it okay if I write down your answers for our study?

☐ no

☐ yes

✓ That’s okay. We’ll talk, but I won’t write down your answers for the study.

(use Q 1–6 for your own records)

✓ Thank you. As we talk, I’ll write down your answers for the study.

Perhaps I can start by asking how you’re doing... when you started the study, you said you:

☐ did not plan to quit smoking in the next six months. Is that still how you feel?

☐ might consider quitting smoking within the next six months. Is that still how you feel?

☐ planned to quit smoking in the next month. Have you made any progress in that direction?

... Offer appropriate education and counselling as shown on page 2 ...

Complete this sentence based on participant’s baseline stage!
<table>
<thead>
<tr>
<th>no plans to quit</th>
<th>still planning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acknowledge that quitting is not an option right now.</td>
<td>Acknowledge participant's commitment to quitting.</td>
</tr>
<tr>
<td>Talk about how smoking is pleasurable, and ask “If you had to say 3 things you like about smoking, what would they be?”</td>
<td>Talk about participant’s reasons for quitting</td>
</tr>
<tr>
<td>Later in the interview... Point out that even enjoyable things can have little drawbacks (give an example).</td>
<td>Ask “If you’re thinking about it, you must have some reasons for quitting. Could you share them with me?”</td>
</tr>
<tr>
<td>Ask “What don’t you like about smoking?”</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>‘unsuccessful’ quit attempt</th>
<th>quit &amp; still smokefree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congratulate participant for trying.</td>
<td>Congratulate participant for quitting (could do Q1-5 now)</td>
</tr>
<tr>
<td>Acknowledge that quitting can be hard to do, encourage them to keep trying, and normalize relapse.</td>
<td>Acknowledge her/his commitment to staying smoke free. “It’s great that you quit. What made you decide to do it?”</td>
</tr>
<tr>
<td>Talk about participant’s reasons for quitting, and ask “What were some of your reasons for quitting smoking?”</td>
<td>Ask about their plans to deal with ‘triggers’ and talk about ways to prevent relapse.</td>
</tr>
</tbody>
</table>

To finish up, I have a dozen quick questions to ask as part of the study. It will take 7 or 8 minutes.

... Administer 4-week interview ...

... Conclude phone call as follows: ...

Restate precontemplators’ disliked aspects of smoking: Well, that’s it. When we started this call, you told me that one thing you don’t like about smoking is __________. I hope that you will think about this some more, and maybe even think about quitting some time in the future.

Restate all other participants’ reasons for quitting: Well, that’s it. When we started this call, you told me that you want to quit smoking because __________. I hope that you keep it in mind, and keep trying to quit (stay smoke free).

To thank you for your time, I’d like to enter your name in a draw for a $10 movie pass. If you’re the winner, I’ll give you a call in the next 2 weeks to let you know. And if not, I’ll be calling you for the final interview 2 months from now. – Do you have any questions for me?

And, is it still okay for me to send your answers to the researchers? □ yes □ no   Thanks!
Appendix C

3-Month Follow-Up Interview Questions
CALL BACK GUIDELINES FOR LTPB STAFF MEMBER

- Introduce yourself, identifying Leave The Pack Behind. Remind the participant that he/she signed up for the contest and agreed to participate in the study of the contest.
- Explain why you are calling, and ask for consent to continue using participant's answers in the study.
- Obtain answers for all questions in the protocol. If you miss a question, don't guess! Just leave it blank.
- Finish the interview by asking how to contact them for the 6-month follow-up interview. Repeat the request for consent. Answer any questions. Explain how participant can pick up the gift certificate.

PROTOCOL ('SCRIPT') FOR INTERVIEW

Hi __________, this is __________. I'm with the Leave The Pack Behind Project at [university].

About 3 months ago you registered for the 'Let's Make A Deal' contest and volunteered to be in a study of the contest.

So __________, if it's okay with you, I'd like to ask you some questions for the study. It will only take 7 or 8 minutes of your time. Your name will never be given to the researchers, all of your answers will be anonymous, and there will be no way to trace them back to you. Of course, your participation is completely voluntary. So, is it okay to write down your answers for our study & confirm you mailing address so that I can send you a movie pass?

☐ yes ☐ no

Thank you. As we talk, I'll write down your answers for the study. That's okay. We'll talk, but I won't write down your answers for the study.

☐ yes ☐ no

What day and time would be better? No problem. We'll try you again 3 months from now. (Offer incentive)
For this interview, I have a dozen quick questions to ask as part of the study. It will take 7 or 8 minutes.

... Administer 3-month interview ...

... Conclude phone call as follows: ...

Well, that’s it. Thanks for taking the time to speak with me today. If you have any questions about smoking or quitting, please feel free to visit the Leave The Pack Behind website. Just a reminder that your next call will occur June [date]. Can I call you at this phone number on that day or is there a better number for me to reach you at?

(If they give you a new phone number): Has any other contact information changed (i.e. email, address) that would be helpful for us in contacting you in June?

* offer gift certificate: To thank you for your time, LTPB would like to give you a $2 Tim Horton’s gift certificate. [Verify address].

* ensure participant has no questions: Do you have any questions for me? .

* make results available: If you’d like the results of this study, visit LTPB.org. They’ll be posted there.

* ask for consent: Is it still okay for me to send your answers to the researchers? □ yes □ no

Thanks!
1. It’s been 3 months since we last contacted you. Since that time, has your smoking stayed the same... increased... decreased... or pretty much stopped?
   - same
   - increased
   - decreased
   - pretty much stopped
   \( ^{\downarrow} \text{skip to question 9,} \) 
   \( ^{\downarrow} \text{complete this page} \)

2. Are you trying to quit right now?
   - NO... OR... Not now, but I did try in the past 3 months
   - YES... OR... Actually, I have already stopped smoking!

3. In the past 7 days, have you smoked a cigarette?
   - yes, I have
   - no, I haven't
     - Not even a puff?
   - did not have a puff
     - In the last 30 days, have you had a cigarette?
       - yes, I have
       - no, I haven't
         - Not even a puff?
         - did not have a puff

4. So, how long have you been totally smoke-free, without a single puff? \( \text{____ days} \)

5. For the last few [weeks]/[months], you’ve been smokefree, with just an occasional cigarette here and there. Can you give me more details about those cigarettes... How much or how often you have smoked?

6. What made you smoke?
7. Tell me how you quit. [prompts] What did you use? How did you cope with withdrawal?

8. Now I’d like to ask how sure you are, right now, that you could resist certain urges to smoke. I’d like you to answer on a 7-point scale where 1 is not at all sure and 7 is totally sure... So, how sure are you that you could resist the urge to smoke when:
   - you have a craving 1 2 3 4 5 6 7
   - you feel stressed 1 2 3 4 5 6 7
   - you’re partying with friends 1 2 3 4 5 6 7
   - someone offers you a cigarette 1 2 3 4 5 6 7
   ~ the end ~~ the end ~~ the end ~~ the end ~~ the end ~~ the end ~~ the end ~~

9. In the past 3 months, did you try to quit smoking? □ no [skip to 14.] □ yes [ask 10.-16.]

10. How many times? (in past 3 months) ___________________

11. Of those times, how long did your longest quit attempt last? _______ days
   longest attempt in past 3 months

12. What about your most recent attempt... How long did it last? _______ days
   most recent attempt in past 3 months

13. What made you start smoking again?

14. Counting even the puffs you took from a cigarette, how many cigarettes did you smoke last week? ______ cigs or ______ packs

15. Do you plan to quit smoking in the next 6 months?  
   □ no 
   □ yes → Do you plan to quit in the next month? □ yes  □ no

16. Now I’d like to ask how sure you are that you could resist temptations to smoke. I’d like you to answer on a 7-point scale where 1 is not at all sure and 7 is totally sure...
   ... So, how sure are you that you could resist the temptation to smoke when:
   - you have a craving 1 2 3 4 5 6 7
   - you feel stressed 1 2 3 4 5 6 7
   - you’re partying with friends 1 2 3 4 5 6 7
   - someone offers you a cigarette 1 2 3 4 5 6 7

Return to the counselling protocol Arrange incentive, and access to results! Answer any questions.
Appendix D

6-Month Follow-Up Interview Questions
CALL BACK GUIDELINES FOR LTPB STAFF MEMBER

Introduce yourself, identifying Leave The Pack Behind. Remind the participant that he/she signed up for the contest and agreed to participate in the study of the contest.

- Explain why you are calling, and **ask for consent** to continue using participant's answers in the study.
- Obtain answers for **all** questions in the protocol. If you miss a question, **don’t guess**! Just leave it blank.
- Finish the interview by asking how to contact them for the 1-year follow-up interview. Repeat the request for consent. Answer any questions. Explain how participant can pick up the gift certificate.

---

**PROTOCOL (‘SCRIPT’) FOR INTERVIEW**

Hi __________, this is __________. I’m with the Leave The Pack Behind Project at [university].

About 6 months ago you registered for the ‘Let’s Make A Deal’ contest and volunteered to be in a study of the contest.

So __________, if it’s okay with you, I’d like to ask you some questions for the study. It will only take 7 or 8 minutes of your time. Your name will never be given to the researchers, all of your answers will be anonymous, and there will be no way to trace them back to you. Of course, your participation is completely voluntary. **So, is it okay to write down your answers for our study & confirm your mailing address so that I can send you a movie pass?**

☐ yes  ☐ no

Thank you. As we talk, I’ll write down your answers for the study.

That’s okay. We’ll talk, but I won’t write down your answers for the study.

☐ yes  ☐ no

What day and time would be better?

No problem. We’ll try you again 6 months from now. (Offer incentive)
For this interview, I have a dozen quick questions to ask as part of the study. It will take 7 or 8 minutes.

... Administer 6-month interview ...

... Conclude phone call as follows: ...

Well, that's it. Thanks for taking the time to speak with me today. If you have any questions about smoking or quitting, please feel free to visit the Leave The Pack Behind website. Just a reminder that your next call might occur January [date]. Can I call you at this phone number on that day or is there a better number for me to reach you at?

(If they give you a new phone number): Has any other contact information changed (i.e. email, address) that would be helpful for us in contacting you in January?

* offer gift certificate: To thank you for your time, LTPB would like to give you a $10 movie pass gift certificate. [Verify address].

* ensure participant has no questions: Do you have any questions for me?

* make results available: If you’d like the results of this study, visit LTPB.org. They’ll be posted there.

* ask for consent: Is it still okay for me to send your answers to the researchers? □ yes  □ no

Thanks!
1. It's been 3 months since we last contacted you. Since that time, has your smoking stayed the same... increased... decreased... or pretty much stopped?
   - same
   - increased
   - decreased
   - pretty much stopped

   The next questions are standardized measures that I must ask in a precise way. They may sound artificial, or even insensitive, but do your best to answer them.

2. Are you trying to quit right now?
   - NO... OR... Not now, but I did try in the past 3 months [discuss answer as needed, then skip to 9.]
   - YES... OR... Actually, I have already stopped smoking! [continue to 3.]

3. In the past 7 days, have you smoked a cigarette?
   - yes, I have [skip to 9.]
   - no, I haven't → Not even a puff?
     - had a puff [skip to 9.]
     - did not have a puff → In the last 30 days, have you had a cigarette?
       - yes, I have [ask 4, 5, 6, and 8.]
       - no, I haven't → Not even a puff?
         - had a puff [ask 4, 5, 6, and 8.]
         - did not have a puff [ask 4, 7, and 8.]

4. So, how long have you been totally smoke-free, without a single puff? _______ days

5. For the last few [weeks]/[months], you've been smokefree, with just an occasional cigarette here and there. Can you give me more details about those cigarettes... How much or how often you have smoked?

6. What made you smoke?

Answer should be less than 30 (days) unless respondent always reported: did not have a puff

ONLY for respondents who smoked, even a puff within the past month (but more than a week ago).
7. Tell me how you quit. [prompts] What did you use? How did you cope with withdrawal?

8. Now I’d like to ask how sure you are, right now, that you could resist certain urges to smoke. I’d like you to answer on a 7-point scale where 1 is not at all sure and 7 is totally sure... So, how sure are you that you could resist the urge to smoke when:
   ...you have a craving  1 2 3 4 5 6 7
   ...you feel stressed  1 2 3 4 5 6 7
   ...you’re partying with friends  1 2 3 4 5 6 7
   ...someone offers you a cigarette  1 2 3 4 5 6 7

~ the end ~ the end ~ the end ~ the end ~ the end ~ the end ~

9. In the past 3 months, did you try to quit smoking? □ no [skip to 14.] □ yes [ask 10. - 16.]

10. How many times? (in past 3 months) ____________

11. Of those times, how long did your longest quit attempt last? ____________ days
   longest attempt in past 3 months

12. What about your most recent attempt... How long did it last?
   ____________ days
   most recent attempt in past 3 months

13. What made you start smoking again?

14. Counting even the puffs you took from a cigarette, how many cigarettes did you smoke last week? _____ cigs or _____ packs

15. Do you plan to quit smoking in the next 6 months?
   □ no
   □ yes → Do you plan to quit in the next month? □ yes □ no

16. Now I’d like to ask how sure you are that you could resist temptations to smoke. I’d like you to answer on a 7-point scale where 1 is not at all sure and 7 is totally sure...
   So, how sure are you that you could resist the temptation to smoke when:
   ...you have a craving  1 2 3 4 5 6 7
   ...you feel stressed  1 2 3 4 5 6 7
   ...you’re partying with friends  1 2 3 4 5 6 7
   ...someone offers you a cigarette  1 2 3 4 5 6 7

~ the end ~ the end ~ the end ~ the end ~ the end ~
Appendix E

Selected Pages From Smoke|Quit
OK OK So light cigarettes are just as bad as regular, and everyone knows that smoking kills eventually. SO WHAT?

After all, nicotine itself isn't that bad... nicotine in cigarettes is more addictive than heroin or crack-cocaine. It's the tar and 4,000 chemicals that will kill you.

Quitting is in the 5-year plan. You'll quit when you're good and ready. But for now, you'll just keep on enjoying your cigarettes.
It's like this and like that and like this

There's your room mate.
You've been sharing a place for a year already.
You like the same food.
You have the same friends.
You even pick the same movies to see.

You like almost EVERYTHING about your room mate...

Except that 1 LITTLE thing...

Your apartment is fantastic, very cool.
You've got the best posters, cool beer mugs, a backyard to chill to some good tunes.

Is This How You Feel About Smoking?

But the neighbours.
Definitely not cool.
They play that funky music way too early in the a.m. that you could do without...
KNOW THE IMPLICATIONS

Tobacco production and use significantly affects our world.

Each year, 200,000 hectares of forests and woodlands are removed by tobacco farming (Geist, 1999) and 93% of this deforestation happens in developing countries. To make matters worse, the local people are breathing in fumes and chemicals as manufacturers prepare cigarettes for you. So... if you or someone you know is backpacking through South America or the Caribbean be sure to take pictures of this historic sight.

Geist, Tobacco Control (8), 1999

Include those in your memorabilia.

KNOW THE PERSONAL RISKS

Smoking does more than just cause disease.

THINK ABOUT THIS

Your friends are 30 years old. Her biological clock is ticking away. And they are having trouble getting pregnant. OUCH!

It is cuz he smokes & his sperm is deformed <scary but true> or cuz he can’t get/keep it up... OOOHHHHH...

Maybe she smokes and is having a hard time getting/staying pregnant...

...too sad for words...

Wouldn’t it be easier to quit before trying to get pregnant?

Even if she has a baby, experts say breast is best... But, if mom is smoking, the breast milk will have nicotine & chemicals from the tobacco. Smoke in the home is also associated with Sudden Infant Death Syndrome (SIDS)

Think about your future - is this what you see for yourself and your family?
Identify Smoke Signals

**What Can You Do Instead?**

**At the Bar**
- switch to non-alcoholic drinks
- sip your drink slowly

**Driving**
- chew gum or sip water
- listen to your favorite music

**When Your Roommate Smokes**
- ask them to smoke outside
- check your email
- take out the garbage

**Between Classes**
- avoid common smoking areas
- socialize with non-smokers

**During Exams/TERM Papers**
- plan healthy breaks
- learn ways to control stress
- talk to career services for ideas

**As You Talk on the Phone**
- draw on a pad of paper
- chew gum

**When You Are Bored**
- carry a magazine/book with you
- keep something in your hands
- volunteer in your spare time

**After a Meal**
- get up and brush your teeth
- do your dishes

**First Thing in the Morning**
- jump in the shower right away
- eat a healthy breakfast

**With Your Coffee**
- skip the coffee shop for a week
- order fruit juice, water or tea

---

Your Inner Voice

When some smokers think about quitting, they feel overwhelmed. Do you ever find yourself saying things like:

**I'll never be able to handle this!**

**I can't possibly go to the bar and not smoke!**

Think of a time in your past when you had to do something but felt like you couldn't. Maybe it was something like public speaking - you know... that first time you had to get up in front of mom, dad and 100 of your classmates to speak about your science project. You probably dreaded it - thinking that you'd do something that would make you look stupid. But somehow, you got through it - and yeah, maybe you stumbled a bit or turned pitch red from sheer embarrassment, and you probably felt pretty uncomfortable. **BUT you handled it.**

When you quit smoking, you've got to remember other "unbearable" situations that you handled. Ask yourself, what's the worst that can happen? Your friends will cast you out of their group? You will pass out from the lack of nicotine? **Probably not.**

When you think "I can't do this, I can't cope," remind yourself of "worst case scenarios" (like the one above) that were still manageable. Remind yourself that not smoking will feel unpleasant, but it won't kill you, and you are quite capable of quitting smoking. Use past experiences to **CONQUER** the belief that quitting is impossible.
ALITTLE HELP FROM YOUR FRIENDS

Some smokers don't want to tell their friends that they're planning to quit 'cuz they're worried they might fail or let people down; but did you know that announcing plans to quit is a proven strategy for successful quitting?

AT THE VERY LEAST
pick ONE person you know will support you.

Tell 'em that you're quitting

WHY AM I DOING THIS AGAIN

You know why you're doing this again! You have your reasons. Write down your TOP 4 reasons for wanting to be smoke-free.

AT THE VERY LEAST
Cut this list out and put it in a place where you will always see it... your fridge, your bulletin board, your day planner, your wallet... so when you want to buy a pack of smokes, you'll remember why you want to quit.
Use the diary on pages 33 to 35 a few days before you actually quit.

Use it to identify situations, places, people, and emotions that may still make you want to smoke after you quit. Each number in the left hand column represents a cigarette. For each cigarette you smoke, write down when you smoked it, where you were, who you were with, how you felt, and how strong the craving was - mild, moderate, or strong.

On Day One, simply keep track of your smoking.

On Day Two, cut back by at least 3 cigarettes by eliminating the ones you craved the least.

On Day Three, try to cut back by 3 more cigarettes. (And make your final plan to quit)

Pick a date and a time that is not stressful. For example, don’t decide to quit during the middle of exams - wait until they are done. If you just broke up with your girl/boyfriend, you might want to postpone quitting until you feel more stable and less emotional. (Of course, some people believe there’s no time like the present!) Postpone, but don’t cancel!

I will quit smoking on

DATE

Create Your Quit Plan
Appendix F

Script and Print for Obtaining Informed Consent
Verbal explanation of study. LTPB student-staff will highlight key features of the study to potential participants as follows:

“You might be interested in a study we’re doing on the outcomes of this contest. This information page [gesture appropriately] explains the whole study in detail, but maybe I could give you just a few highlights to see if you might be interested in learning more about it or even taking part in it ... First, let me say that participation in the study would be completely voluntary, and we [LTPB] are at your service whether or not you participate. You also should know that you do not have to participate in this study in order to be in the contest. If you did take part, though, here’s what would happen. Besides being in the contest like everyone else, you’d also complete a quick questionnaire, and get three phone calls, 3 months, 6 months, and one full year from now. The questionnaire you fill out now and the phone calls would ask about your smoking and quitting thoughts and behaviours. All the information you provide would always be kept secure and confidential; only the LTPB student-staff member who calls you would know your name. Your answers would be given to the researchers with only a code number written on them – never your name. And finally, to thank you for helping us, we would give you a $2 gift certificate for Tim Horton’s at the 3-month call, a $5 movie pass at the 6-month call, and enter you in a draw for a prize valued at approximately $50 at the 1-year call. Do you think you might be interested?

IF YES... In that case, please read this consent form .... If you have any questions, just ask me. Then, if you want to take part, we’ll both sign the form.

IF NO... No problem! We [LTPB] look forward to supporting you as you go through the contest.
Consent Form

Long-Term Outcomes of a Campus-Based Smoking Cessation Contest

Researchers from Brock University are investigating the long-term outcomes of the 'Let's Make A Deal!' contest offered by Leave The Pack Behind. If you are in the Quit For Good or the Keep The Count deals, you are invited to join the study. If you take part in the study, you will:

1. complete this consent form,
2. ensure that your current and permanent telephone number(s), email address(es), and mailing addresses appear on the contest registration form
3. fill in a short survey about your smoking and quitting behaviours and intentions
4. complete 3 telephone interviews that will occur 3, 6, and 12 months from now.

How do the phone calls work?

A Leave The Pack Behind Peer Educator (a senior or grad student who works for LTPB) will telephone you to gather 'follow-up' information about your tobacco consumption, your quitting intentions and experiences, and your attitudes toward smoking and quitting. Each call will last 5–10 minutes.

What if you can't reach me by phone?

If the Peer Educator is unable to reach you by telephone, an email will be sent to you asking you to respond by phone or return email. If no response is received from you, a package will be sent to your permanent address. (Please note: this is a final resort only). Inside the package, an information page, questionnaire and return envelope will be enclosed in a BLANK ENVELOPE marked only with your name. An 'open' cover page will indicate that the envelope should be forwarded to you unopened.

How will my information be handled?

Your information will always be treated confidentially. All forms that are forwarded to the researchers will be marked with an ID code, never your name. Below are further steps we will take to protect your privacy.

TODAY

Your completed contest registration form, consent form, and questionnaire will be placed in an envelope. The envelope will be delivered to the LTPB campus office. At the office, a trained Peer Educator will 'process' the forms as follows:

* your name, id code, current phone number(s), weekly tobacco consumption, and readiness to quit smoking will be copied (from your contest registration form and questionnaire) onto a new 'Participant Tracking Form' that will be held securely in a locked filing cabinet (accessible only to the Peer Educator who telephones you and the Nurse/Health Educator who supervises the Peer Educator)
* your consent form will be sealed in an envelope and locked in a filing cabinet in the LTPB office where it will remain until the study is done.
* your contest registration form will be locked in a filing cabinet where it will remain unless you can not be reached at one of the follow-up times; then, it will be retrieved by the Peer Educator and the additional contact information you provided will be used in further attempts to reach you.
* Your anonymous questionnaire (marked with your identifier code but not your name) will be forwarded to the researchers at Brock University.

3-MONTHS FROM NOW

A Peer Educator will use the information on your Participant Tracking Form to call you for your first follow-up interview. Your answers to the interview questions will be written on a separate data collection form marked only with your identifier code number. At the end of the call, the Peer Educator will 'process' the forms as follows:

* your phone number(s) will be updated on your participant tracking form (if necessary), and it will be returned to the secure filing cabinet
* If your address has changed, the Peer Educator will retrieve your contest registration form, update it, and return it to the locked filing cabinet
* Your anonymous data collection form (marked with your identifier code but not your name) will be forwarded to the researchers at Brock University.
6-MONTHS FROM NOW
The same procedures will be used for your second follow-up interview.

1-YEAR FROM NOW
The same procedures will be used for your final interview.

During Data Analysis

Information from your questionnaires and data collection forms will be entered into a computer, then all forms will be locked in a cabinet that is accessible only to the researchers (a professor, a graduate student and a Nurse). At the end of the study ALL forms will be shredded. The anonymous electronic data will be kept for several years for analysis by the researchers.

The results of this study will be reported through lay, professional, and academic venues (e.g., conferences, journal articles, web pages, etc.). All reports will refer to grouped data and not to individuals. You and your answers can not be identified in any way. For your own copy of the results, see www.LeaveThePackBehind.org.

What else should I know?

You should know this study is funded by Government of Ontario and Health Canada and has been reviewed and received ethics approval through the Brock Research Ethics Board. There are no foreseeable psychological, physical, social or economic risks posed by this study, and should any emerge, you’ll be informed right away. On the other hand reducing or quitting smoking has a host of benefits! Besides … each time you answer the phone you’ll receive a gift: a $2 coupon for Tim Horton’s at 3-months; a $5 movie pass at 6-months; and entry into a draw for a prize valued at $50 at 1-year. (Refuse the phone interview, and you’ll still receive the gift for that follow-up). More importantly, if you agree to be in the study, your involvement will always be completely voluntary and you may withdraw from the study at any time, for any reason with no penalty. Whether or not you choose to participate, you can always access a full range of interesting and effective programs and services offered by LTPB: self-help programs; phone support; Quit Kits; CO testing; referrals to health professionals; and many other educational resources.

If you wish to discuss issues arising from participation, you can contact:
Dr. Kelli-an Lawrence, Principal Investigator (Brock University, 905-688-5550 ext. 4288);
Melodie Shick-Porter, RN, BScN, Director of Clinical Services, Health Educator/LTPB Supervisor, Student Health Services, (905-688-5550 ext. 3243);
Research Ethics Officer, Office of Research Services (905.688.5550 ext. 3035)

Statement of Consent: I have been provided with 2 copies of this information/consent form; one to return to the researchers, and one to keep for my records. I have been informed of the names and phone numbers of the researchers, and LTPB supervisor at (university). I have read and understood all the information presented here. Any questions I had about the study have been answered. Based on the information presented to me, I agree to participate in the study.

Name: ____________________________________________

Cell: ___________________ Home: ___________________ Alternate: ___________________

Signed: ___________________________ Date: ________________

Witnessed: ___________________________ Date: ________________
Appendix G

Participant Tracking Form
CONTEST STUDY

Participant Tracking Form

BASELINE

Name: ________________________________

Home: ________________________________ Mobile: ________________________________

Email 1: ______________________________ Stage: ________________________________

Email 2: ______________________________ Weekly consumption: ____________ cigarettes

4-WEEK SUPPORT CALL

Date of contact: ______________________________

STILL SMOKING

☐ increased ______________________________

☐ stayed same ______________________________

☐ decreased (☐ temporary / ☐ permanent) ______________________________

Stage: ______________________________

Weekly consumption: ____________ cigarettes

Quit Date: ______________________________

QUIT SMOKING

__________ days ago

COMMENTS:

3-MONTH DATA COLLECTION

Date of contact: ______________________________

STILL SMOKING

☐ increased ______________________________

☐ stayed same ______________________________

☐ decreased (☐ temporary / ☐ permanent) ______________________________

Stage: ______________________________

Weekly consumption: ____________ cigarettes

Quit Date: ______________________________

QUIT SMOKING

__________ days ago

COMMENTS:
**6-MONTH DATA COLLECTION**

<table>
<thead>
<tr>
<th>Date of contact:</th>
<th></th>
</tr>
</thead>
</table>

**STILL SMOKING**
- [ ] increased
- [ ] stayed same
- [ ] decreased (☐ temporary / ☐ permanent)

<table>
<thead>
<tr>
<th>Stage:</th>
<th>Weekly consumption: _________ cigarettes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**QUIT SMOKING**

<table>
<thead>
<tr>
<th>_______ days ago</th>
<th></th>
</tr>
</thead>
</table>

**COMMENTS:**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
Appendix H

Proposed Analyses and Reasons for Modification
Appendix H

Proposed Analyses and Reasons for Modification
Original Questions and Proposal Analyses

Contestants Who Quit

What were the 3-, 6-, and 12-month abstinence rates? The proportion of contestants who experienced complete abstinence for 3, 6, and 12 months will be tabulated. A chi-square will be run with sustained 12-month abstinence (yes/no) as the dependent variable and contest category (‘Quit for Good’/’Keep the Count’) as the independent variable. The overall proportion of quitters as well as the proportion in each category will be repeated.

What are the characteristics of contestants who sustained a 12-month period of abstinence relative to those who did not sustain a 12-month period of abstinence? A logistic regression will be conducted to predict the dichotomous outcome (sustained quit: yes/no) from six independent variables; gender, contest category (‘Quit for Good’/’Keep the Count’), stage at baseline, weekly tobacco consumption at baseline, self-efficacy at baseline, and previous quit attempts at baseline.

How did the sustained quitters’ efficacy levels change over time? Using a oneway repeated measures ANOVA with efficacy to resist temptation to smoke as the dependent variable, changes in efficacy will be examined over the four times (baseline, 3-, 6-, and 12-month follow-ups). A significant overall F test will be followed up with univariate pairwise comparisons. (Assumptions related to normality, homogeneity of variance, independence of errors, sphericity, and outliers will be assessed and corrections will be applied as needed).

What are sustained quitters’ perceptions of how they quit and what they did to cope with withdrawal? For both of these open-ended questions, qualitative analyses will
be used. Specifically, trends in participants’ responses will be described in order to find patterns of behaviour.

**Contestants Who Did Not Quit**

How many non-quitters made at least one quit attempt (lasting more than 7 days) then relapsed to smoking? The proportion of contestants who made an unsuccessful quit attempt (lasting more than 7 days) will be tabulated using the frequency procedure. A chi-square will be run to determine whether making an unsuccessful quit attempt (yes/no) depends on which contest category (‘Quit for Good’/’Keep the Count’) they entered.

What are the characteristics of contestants who relapsed to smoking after a quit attempt lasting more than 7 days relative to contestants who continued smoking (or relapsed sooner than 7 days)? A logistic regression will be conducted to predict the dichotomous outcome (quit attempt lasting 7 days or more: yes/no) from six independent variables; gender, contest category (‘Quit for Good’/’Keep the Count’), stage at baseline, weekly tobacco consumption at baseline, self-efficacy at baseline, and previous quit attempts at baseline.

**Contestants Who Continued Smoking (never quit longer than 7 days)**

How did their efficacy levels change over the follow-up periods? Using a oneway repeated measures ANOVA with efficacy to resist temptation to smoke as the dependent variable, changes in efficacy will be examined over the four times (baseline, 3-, 6-, and 12-month follow-ups). A significant overall F test will be followed up with univariate pairwise comparisons. (Assumptions related to normality, homogeneity of variance,
independence of errors, sphericity, and outliers will be assessed and corrections will be applied as needed).

_How did their tobacco consumption change over the follow-up periods?_ Any possible changes in tobacco consumption over the course of the study will also be assessed through another oneway repeated measures ANOVA.

_Contestants Who Relapsed Into Smoking (made one or more quit attempts that lasted longer than 7 days)_

_How did their efficacy levels change over the follow-up periods?_ Using a oneway repeated measures ANOVA with efficacy to resist temptation to smoke as the dependent variable, changes in efficacy will be examined over the four times (baseline, 3-, 6-, and 12-month follow-ups). A significant overall F test will be followed up with univariate pairwise comparisons. (Assumptions related to normality, homogeneity of variance, independence of errors, sphericity, and outliers will be assessed and corrections will be applied as needed).

_How did their tobacco consumption change over the follow-up periods?_ Any possible changes in tobacco consumption over the course of the study will also be assessed through another oneway repeated measures ANOVA.

The remaining questions are related to patterns of relapse behaviour. Analyses to answer these questions will be largely descriptive. Thus, to answer the questions: how many quit attempts did they make that lasted more than 7 days, how long did each quit attempt last, and when did the quit attempt(s) occur, frequency procedures will be used to calculate percentages, means, and standard deviations as required. Qualitative analyses
will be used to describe their perceptions of how they quit and what caused them to relapse to smoking.

Reasons for Modifying Questions and Analyses

Due to lower than expected registration rates, difficulty reaching participants, high attrition rates, and the foreseeable difficulty in reaching students for their final one year follow-up as they would likely be living in another residence but did not have this contact information during the 6-month follow-up period, it was decided to cancel the final follow-up call which would have occurred in January 2005. It was decided that a 6-month follow-up period was adequate time to determine quit attempts and success rates as well as assess any cessation maintenance, which is defined by the stages of change theory as occurring after a 6-month period (Prochaska, DiClemente, & Norcross, 1992).
Appendix I

Comparisons of Participants Who Did and Did Not Provide 3-Month Follow-Up Data
## Comparisons of Participants Who Did and Did Not Provide Three-Month Follow-Up Data

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Completed 3-Month Follow-Up (N = 61)</th>
<th>Did Not Complete 3-Month Follow-Up (N = 13)</th>
<th>( \chi^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Contest Category</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quit For Good</td>
<td>46</td>
<td>75.41</td>
<td>11</td>
</tr>
<tr>
<td>Keep The Count</td>
<td>16</td>
<td>26.23</td>
<td>2</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>31</td>
<td>50.82</td>
<td>6</td>
</tr>
<tr>
<td>Female</td>
<td>30</td>
<td>49.18</td>
<td>7</td>
</tr>
<tr>
<td>Self-reported smoking status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-smoker who smokes sometimes</td>
<td>3</td>
<td>4.92</td>
<td>2</td>
</tr>
<tr>
<td>Light smoker</td>
<td>8</td>
<td>13.11</td>
<td>1</td>
</tr>
<tr>
<td>Regular/medium smoker</td>
<td>38</td>
<td>62.30</td>
<td>7</td>
</tr>
<tr>
<td>Heavy smoker</td>
<td>6</td>
<td>9.84</td>
<td>3</td>
</tr>
<tr>
<td>Ex-smoker who has totally quit</td>
<td>6</td>
<td>9.84</td>
<td>0</td>
</tr>
<tr>
<td>How soon after waking have 1st cigarette</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within 5 minutes</td>
<td>7</td>
<td>11.48</td>
<td>3</td>
</tr>
<tr>
<td>Within 6-30 minutes</td>
<td>24</td>
<td>39.34</td>
<td>2</td>
</tr>
<tr>
<td>Within 31-60 minutes</td>
<td>17</td>
<td>27.87</td>
<td>6</td>
</tr>
<tr>
<td>After more than an hour</td>
<td>13</td>
<td>21.31</td>
<td>2</td>
</tr>
<tr>
<td>Characteristics</td>
<td>Completed 3-Month Follow-Up (N = 61)</td>
<td>Did Not Complete 3-Month Follow-Up (N = 13)</td>
<td>( \chi^2 )</td>
</tr>
<tr>
<td>-----------------------------------------------------</td>
<td>-------------------------------------</td>
<td>--------------------------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td></td>
<td>( n )</td>
<td>( % )</td>
<td>( n )</td>
</tr>
<tr>
<td>Tried to quit in past month (yes)</td>
<td>25</td>
<td>41.00</td>
<td>3</td>
</tr>
<tr>
<td>Place of residence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Live with parents</td>
<td>22</td>
<td>36.07</td>
<td>4</td>
</tr>
<tr>
<td>Live in residence</td>
<td>10</td>
<td>16.39</td>
<td>4</td>
</tr>
<tr>
<td>Live off-campus (alone or with others)</td>
<td>29</td>
<td>47.54</td>
<td>5</td>
</tr>
<tr>
<td>How often people live with smoke</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at all</td>
<td>26</td>
<td>42.62</td>
<td>3</td>
</tr>
<tr>
<td>Time to time</td>
<td>15</td>
<td>24.59</td>
<td>0</td>
</tr>
<tr>
<td>Regularly</td>
<td>20</td>
<td>32.79</td>
<td>10</td>
</tr>
<tr>
<td>Friends or roommates smoke (yes)</td>
<td>56</td>
<td>91.80</td>
<td>13</td>
</tr>
<tr>
<td>Members of family smoke (yes)</td>
<td>28</td>
<td>45.90</td>
<td>6</td>
</tr>
<tr>
<td>Significant other smokers (yes)</td>
<td>18</td>
<td>29.51</td>
<td>5</td>
</tr>
</tbody>
</table>

* \( p = .01 \)
### Mean Comparisons of Participants Who Did and Did Not Provide Three-Month Follow-Up Data

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Complete 3-Month Follow-Up (N = 61)</th>
<th>Did Not Complete 3-Month Follow-Up (N = 13)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( M )    ( SD )</td>
<td>( M )    ( SD )</td>
</tr>
<tr>
<td>Number of cigarettes smoked/week</td>
<td>41.67      41.06</td>
<td>49.69     53.79</td>
</tr>
<tr>
<td>Efficacy to resist smoking(^1)</td>
<td>4.00       1.27</td>
<td>4.19      1.14</td>
</tr>
<tr>
<td>Age</td>
<td>22.73      5.16</td>
<td>22.31     4.64</td>
</tr>
</tbody>
</table>

\(^1\) On a Likert Scale of 1 to 7 where 1 represents ‘not at all sure’ and 7 represents ‘totally sure’.