Addictive Behaviors 34 (2009) 531–535

Contents lists available at ScienceDirect

Addictive Behaviors

The impact of email recruitment on our understanding of college smoking

Tina R. Norton [a,*], Amy B. Lazev [b], Robert A. Schnoll [c], Suzanne M. Miller [b]

[a] Department of Psychology, Clarkson University, USA
[b] Fox Chase Cancer Center, USA
[c] Department of Psychiatry, University of Pennsylvania, USA

ARTICLE INFO

Keywords:
College students
Smoking tobacco
Survey methodology

ABSTRACT

Email recruitment is growing in popularity; however, this convenience sampling method may yield very different results from prior convenience sampling methods. Participants in the current study were 825 undergraduate students, 446 recruited through a campus wide email and 379 recruited through Introductory Psychology courses, who completed an on-line survey on smoking and health. Outcomes varied significantly by group. Introductory Psychology students reported higher smoker self-concept, more pros of smoking, and were more likely to view smoking as a method of negative affect reduction. The current study suggests that recruitment method can bias our understanding of smoking behaviors among college students.

Smoking is the single greatest cause of preventable mortality and morbidity in the United States, causing over 440,000 deaths and costing over $75.5 billion in medical care each year (CDC, 2003). The prevalence of smoking in the college student population increased in the 1990′s and is now higher than the prevalence in the general population of smokers (28.5% vs. 21%; CDC, 2007). This increase in prevalence is in stark contrast to the decline in the overall smoking rate seen in adults with a college degree (9.6%; CDC, 2007) and suggests that if current college students do not quit smoking, the prevalence rate among adults who smoke will increase in the future. Despite the high smoking rate, few empirically validated interventions exist for this population (Murphy-Hoefer, Alder, & Higbee, 2004; Patterson, Lerman, Kaufmann, Neuner, & Audrain-McGovern, 2004). In order to develop effective interventions we need to better understand the unique risk factors that drive smoking behavior among college students.

With few exceptions (Emmons, Wechsler, Dowdall, & Abraham, 1998; Rigotti, Lee, & Wechsler, 2000; Rigotti, Moran, & Wechsler, 2005), the majority of studies examining psychosocial predictors of smoking behavior and the effectiveness of cessation interventions among college students have relied on small samples accrued using traditional convenience sampling techniques, such as advertising through campus newspapers, flyers, in-class announcements, and introductory psychology pools (Correia & Benson, 2006; Escoffery, McCormick, & Bateman, 2004; Freeman, Hennessy, & Marzullo, 2001; Hines, 1996; Hines, Fretz, & Nollen, 1998; Lipkus & Prokhorov, 2007; McChargue, Spring, Cook, & Neumann, 2004; Obermayer, Riley, Asif, & Jean-Mary, 2004; Waters, Harris, Hall, Nazir, & Waigandt, 2006; Wetter et al., 2004). With the widespread use of email and the internet, researchers are now using this technology across populations and areas of research (e.g., Clarke et al., 2005; Franklin, Rosenbaum, Carey, & Roizen, 2006; Parrott, Tennant, Olejnik, & Poudevigne, 2008; Robinson & Serfaty, 2008). In particular, these techniques are growing in popularity for surveying and treating addictive behaviors among college students (e.g., Bendtsen, Johansson, & Akerlind, 2006; McAlaney & McMahon, 2007; Morrell, Cohen, Bacchi, & West, 2005; Saitz et al., 2007), perhaps due to the privacy it offers respondents who can complete the survey or intervention in their own home and the widespread computer access on college campuses. Yet, little is known regarding how samples recruited via email or on-line differ from samples recruited in more traditional ways. Addressing this research question can help guide future epidemiologic and intervention studies with college students, a sub-group of the population at particular risk for escalating rates of tobacco use. In the current study we examine how self-reports of smoking behavior, as well as the psychosocial variables proposed to mediate smoking behaviors, differ by recruitment method (introductory psychology pool vs. email).

1. Methods

1.1. Participants and procedure

A sample of 825 undergraduate students age 18–24 was recruited at Clarkson University (a privately-funded university) from September 2006 to May 2007. Two groups of students were recruited. First, students enrolled in Introduction to Psychology courses were invited, through in-class announcements and postings, to participate in a survey of health and smoking behaviors for course credit. Second, the remaining undergraduate students campus-wide (age 18–24) were sent an email invitation to complete the survey for a $10 gift voucher.

* Corresponding author. P.O. Box 5825, Clarkson University, Potsdam, NY 13699, USA. Tel.: +1 315 268 2361; fax: +1 315 268 7118.
E-mail address: tnorton@clarkson.edu (T.R. Norton).

0306-4603/$ – see front matter © 2009 Elsevier Ltd. All rights reserved.
doi:10.1016/j.addbeh.2009.03.017

All students had to complete at least 90% of the survey to receive their incentive. Participants in both groups gave informed consent electronically and completed the survey online at their leisure and the computer of their choice at home or school. Obtaining consent electronically is becoming increasingly common and the approach used in this study is consistent with ethical guidelines that have been suggested for internet research(Anderson & Kanuka, 2003). All students, regardless of survey response, were provided with information on local and national resources for quitting smoking, including websites and toll-free quitlines. To examine whether participants in the campus-wide group were representative of all students, a random subsample of non-responders from the campus-wide group was contacted and asked to complete a 10-minute, abbreviated version of the survey over the phone. Recruitment language and survey descriptions were similar across the three groups sampled.

1.2. Measures

1.2.1. Smoking behaviors

Smoking status was assessed with the National Health Interview Survey (NHIS) criteria (i.e., "have you ever tried a cigarette," "have you smoked 100 or more cigarettes in your lifetime," and "do you now smoke cigarettes: every day, some days or not at all)." Current smokers also completed the Fagerstrom Test of Nicotine Dependence (FTND; Heatherton, Kozlowski, Frecker, & Fagerstrom, 1991), a 6-item, self-report measure of nicotine dependence that possesses satisfactory reliability ($\alpha = .64$).

1.2.2. Perceptions of smoking

Participants completed the following measures: Smoker self-concept ($\alpha = .97$) and abstainer self-concept ($\alpha = .87$) subscales of the 9-item Smoker Self-Concept Questionnaire(Shadel, Mermelstein, & Borrelli, 1996); the pro ($\alpha = .77$) and con ($\alpha = .71$) subscales of the 20-item Decisional Balance Scale(Velicer, DiClemente, Prochaska, & Brnadenburg, 1985); a 5-item knowledge scale ($\alpha = .65$) created for the present study to assess participants' awareness of the harmful health effects of tobacco use (e.g., Smoking can cause cancer); the 10 subscales of the 30-item Brief Smoking Consequences Questionnaire (SCQ; $\alpha = .75$ to $\alpha = .94$;Brandon & Baker, 1991).

1.2.3. Alcohol use

Participants reported the following for the previous 30 days: a) average number of days they drank alcoholic beverages, b) average number of drinks consumed on those days, and c) number of days on which they consumed five or more drinks.

1.2.4. Psychosocial factors

Participants completed the Centers for Epidemiologic Studies — Depression scale ($\alpha = .91$;Radloff, 1977) as a measure of depressive symptomatology and negative emotionality, as opposed to a clinical diagnosis of depression.; the Trait scale of the Spielberger State/Trait Anxiety Inventory ($\alpha = .93$;Spielberger, Gorsuch, & Lushene, 1970); and the 4-item Perceived Stress Scale ($\alpha = .78$;Cohen & Lichtenstein, 1990).

1.3. Analysis plan

First, independent sample *t*-tests and chi-square analyses were used to compare the Introductory Psychology group and campus-wide group on demographics and smoking behaviors. Similar comparisons were made between the campus-wide responders and the subsample of non-responders. Second, multivariate analyses of covariance (MANCOVA) were used to examine differences between the Introductory Psychology group and the campus-wide group. Four sets of analyses were conducted, examining the following dependent variables: a) perceptions of smoking, b) consequences of smoking (10 subscales of the SCQ), c) alcohol use, and d) psychosocial factors. All MANCOVA analyses controlled for participants' age.

2. Results

2.1. Response rate

The response rate in the Introductory Psychology group was 91% (382 of 419 students enrolled in the course). Among students campus-wide, 1948 students were eligible to participate. Fourteen of these students were unreachable by email (e.g., invalid email address) and 457 students responded to the survey, yielding a response rate of 24% (457 of 1934). Of the 839 students who responded to the survey across both mechanisms, two students were excluded because of age (i.e.,

Table 1
Demographic data for study participants.

Variable	Introductory psychology students				Campus-wide students				Non-Responders			
	Mean (SD)	Range	n	%	Mean (SD)	Range	n	%	Mean (SD)	Range	n	%
Age (years) [a,b]	19.25 (1.19)	18–24	379		20.18 (1.29)	18–24	446		21.07 (1.39)	18–24	57	
Sex [b]												
Male			262	69			298	67			49	86
Female			116	31			147	33			8	14
Ethnicity												
Caucasian			336	89			414	93			50	88
African American			10	3			5	1			2	3
Asian			13	3			8	2			1	2
Pacific Islander			1	<1			0	0			1	2
American Indian			5	1			6	1			1	2
Hispanic			9	2			9	2			2	3
Unspecified			5	1			5	1			0	0
Year in school [a,b]												
Freshmen			156	41			96	21			6	11
Sophomore			140	37			86	19			3	5
Junior			45	12			137	31			23	40
Senior			34	9			123	28			22	39
Senior+			4	1			4	1			3	5

Note. SD = Standard deviation.
[a] Indicates a significant difference between Introductory and campus-wide students.
[b] Indicates a significant difference between campus-wide students and non-responders.