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Novel Incentives and Messaging in an Online College Smoking Intervention

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Abstract

Objectives—To examine the feasibility, acceptability, and potential effectiveness of an online intervention targeting college smokers. The incentives involved discounted or free goods and services from businesses proximal to each campus.

Methods—A randomized controlled trial was conducted with 122 current smokers recruited from 2 Southeastern US universities. The intervention involved health behavior monitoring, targeted messaging, and incentives for healthy goods and services versus the American Cancer Society's Guide to Quitting Smoking online.

Results—The intervention achieved greater adherence and utilization (p 's < .001). Overall, 55.6% learned about a local business through this program. At end-of-treatment, intervention participants less frequently attempted to quit (p = .02) but smoked fewer cigarettes/day (p = .05). Both groups demonstrated significant end-of-treatment cessation rates.

Conclusions—This intervention demonstrated feasibility and acceptability.

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Human Subjects Statement

The Emory University Institutional Review Board approved this study, IRB# 00059657.

Conflict of Interest Statement

The authors declare no conflict of interest.

Keywords

smoking cessation; youth; cessation interventions; tobacco control

Addressing smoking in young adulthood is critical endeavor¹ as smoking continues to be the leading preventable cause of morbidity and mortality in the US,^{2–4} with roughly 19.9% of young adults (aged 18–30 years) continuing to smoke.⁵ Whereas daily smoking in the US has declined,^{6,7} nondaily smoking is increasing,⁸ particularly among young adults.^{7,9} Unfortunately, nondaily smoking may be a transitory condition^{10–13} or chronic^{14–16} and is associated with significant smoking-related morbidity and mortality.^{17,18} Nondaily versus daily smokers are less ready or motivated to quit,^{19–22} less confident in their ability to quit,^{23,24} less likely to identify as a smoker,^{9,25} less likely to think of quitting smoking as irrelevant,²⁵ and less likely to seek assistance to quit.^{26,27} This suggests a particularly large challenge in engaging this subgroup of smokers in cessation interventions. Moreover, given that cigarettes have been used historically on a daily basis at higher levels of consumption, almost all cessation research has focused on developing and testing cessation interventions for daily smokers.²⁸ In fact, nondaily smokers typically have been excluded from intervention studies.²⁸ Thus, much of what is known regarding how to treat nicotine dependence in regular smokers may be irrelevant for nondaily smokers in young adulthood. In fact, some pharmacotherapies are contraindicated for nondaily smokers.²⁹ Given these challenges and gaps in the research, pioneering work to address this growing population of smokers is needed.

Research has highlighted communication channels and messaging strategies that might be relevant to this population. Despite lacking prior experience with cessation resources and relatively low motivation for cessation, young adult smokers, including both daily and nondaily smokers, show interest in using technology-based interventions.²⁷ Technology-based (eg, web- or app-based) health behavior change interventions are emerging for many health behaviors and have been shown to be efficacious and have broad reach.^{30,31} This is especially true for young adults, as Internet use exceeds 94%, with 92% of adults frequently checking email.^{32,33} Among young adults, several studies have indicated the potential efficacy for achieving abstinence through technology-based interventions.^{34–36} For example, 2 smoking cessation interventions (EVOLVE and ASPIRE) demonstrated effectiveness for smoking cessation among regular smokers in young adulthood who were motivated to quit.^{37,38} They were not designed, however, to target nondaily smoking among young adults who may be less motivated to quit or engage in smoking interventions.^{26,27} Only one randomized control trial (RCT) focused on college students³⁹ included both daily and nondaily smokers; this study found high rates of adherence (95% adherence) to the 20-week online intervention and differences in abstinence rates (41% in intervention group vs 23% in the control group, $p < .001$). Moreover, we conducted a one-arm trial of a beta version of an online intervention targeting nondaily smokers that showed 100% retention and significant cessation rates.⁴⁰ This supports the promise of using technology-based interventions with a broad range of young adult smokers.

However, engaging individuals in these programs and optimizing intervention adherence are daunting challenges.^{41,42} Some strategies for increasing engagement include using targeted or tailored messaging,^{43–50} making the programs interactive,^{51–53} using multiple contacts and email prompts,^{54,55} and the use of theory to drive intervention content.³⁰ In relation to this last point, the Theory of Reasoned Action⁵⁶ posits that behavior is the direct result of intention, which is, in turn, a function of the individual's attitude toward the behavior and his or her subjective norms about the behavior. Qualitative findings indicated that topics related to these theoretical constructs were relevant to young adult daily and nondaily smoking.²⁵ This research found that barriers to cessation included not seeing oneself as a smoker, difficulty coping with stress, difficulty resisting smoking when consuming alcohol or being around smokers, and disregarding the risk of becoming addicted.²⁵ However, not wanting to become addicted and concerns about the social stigma of being a smoker were potential motivators for cessation.²⁵ Our beta trial research⁴⁰ examined the utility of messaging that focused on considering oneself a smoker versus the social stigma of being perceived as a smoker, secondhand smoke exposure as a burden to others, concurrent alcohol consumption and cigarette smoking, and likelihood of continued smoking or progression to regular smoking by graduation, which demonstrated the acceptability and relevance of these messaging strategies for young adult nondaily smokers.

Another promising strategy for increasing engagement in cessation interventions may be novel incentive structures. Providing incentives both increases adherence to health promotion interventions^{57–59} and promotes behavior change (such as smoking cessation).^{60,61} One way to provide incentives that may have promise for sustainability is to model the incentive structure after other commercially available and popular programs already in existence. Proof of concept is demonstrated by existing programs such as Groupon® or LivingSocial®, which are websites that offer “daily deals” with local businesses. They are growing in profit at high rates.⁶² In fact, consumer spending on daily deals sites will grow from \$873 million in 2010 to \$4.2 billion in 2015.⁶³ One study found: (1) the incidence of profitable promotions through these sites range from 55% and 61%; (2) the deals attract close to 80% new customers; and (3) low dropout rates (ie, businesses not intending to run daily deals again in the future) indicating the sustainability of these programs.⁶⁴ In addition, in 2012, 46% of the population indicated that they plan to use daily deal sites.⁶⁵ Thus, this paradigm may provide an innovative strategy for incentivizing engagement in technology-based health promotion interventions.

Given the aforementioned literature, the current study examined the feasibility, acceptability, and potential effectiveness of an online smoking cessation intervention providing targeted messaging for college students smoking at a range of levels (ie, daily to nondaily), providing interactive and tailored graphical feedback of health behavior information, and providing access to deals for healthy goods and services from local vendors proximal to college campuses. We compared this approach to a static, non-targeted cessation intervention – the American Cancer Society's (ACS) Guide to Quitting Smoking⁶⁶ delivered online. We hypothesized that the intervention versus control condition would demonstrate greater feasibility in retaining participants, greater acceptability in terms of self-reported satisfaction with the intervention content and other indicators of acceptability, and potential effectiveness in increasing cessation rates and reducing cigarette consumption.

METHODS

Procedures and Participants

We conducted a 2-arm RCT to test the feasibility, acceptability, and potential effectiveness of a 6-week beta program targeting college student smokers compared to a traditional cessation program – the ACS’s Guide to Quitting Smoking⁶⁶ – delivered online. This trial has been reported in [ClinicalTrials.gov](https://clinicaltrials.gov/ct2/show/study/NCT01982825) (NCT01982825).

In January 2013, students at 2 colleges in the Southeastern US were recruited via email to complete an online survey. Eligibility requirements for this study included being between the ages of 18 and 30 years. Participants were told that it was a college student health survey assessing various aspects of health, that the survey would take approximately 20 minutes, and that they would receive a \$10 gift card for completing the survey. A random sample of 5000 students at each school was invited to complete the survey (total invited N = 10,000); students were sent up to 3 emails to solicit their participation. Of students who received the invitation, 2002 (20.0%) completed the online survey.

Figure 1 displays participant recruitment and enrollment data. For the trial, eligibility requirements included completing the screening survey and having smoked at least 1 day during the past 30 days. Of the 325 screening survey participants who reported current (past 30-day) smoking, 200 current smokers aged 18 to 30 were randomly selected to be recruited to the trial. These individuals were approached via email and telephone, outlining the basic information regarding the trial. They were told that, if they chose to participate, they would be enrolled in an online program aimed at promoting health for a 6-week period and would receive 2 emails per week to engage in the program. They also were told that they would be asked to complete a baseline survey, a survey after their completion of the program, and a survey 6 weeks after the completion of the program and would be compensated \$10 for completing each assessment. A total of 122 participants who met eligibility requirements were enrolled (61.1% participation), with the majority of participants not enrolled being excluded because they had not smoked in the past 30 days or due to incomplete or incorrect contact information. Once participants consented to the study via an online consent form, participants were randomly assigned to one of the 2 conditions using a random number generator. Participants then were sent an email introducing them to the program to which they were randomized.

Trial Conditions

Intervention condition—Prior to the launch, intervention participants were sent an email specifying the components of the intervention. They were told that they would receive an email twice a week asking them to complete a record of their health behaviors each day for the past 3 or 4 days and that they would receive health-related information and deals to local businesses, regardless of their reported health behaviors. The intervention involved 12 modules delivered via email bi-weekly over the 6-week period, with email contacts on Monday and Thursday each week prompting participants to complete the module. When participants received the biweekly emails, they completed a timeline follow-back reporting the number of minutes exercised, the number of drinks consumed, and the number of

cigarettes they had on each day of the past 3 to 4 days, which was embedded in the email. Upon clicking the “submit” button, participants were routed to the main intervention landing page. The website provided a graphical depiction of their daily exercise, alcohol consumption, and cigarette consumption over the course of the intervention to date.

Additionally, they were presented with 12 modules over the 6-week period, each of which included a video of 60 to 90 seconds in duration and a targeted message (ie, a brief paragraph). The aforementioned modules were based on the Theory of Reasoned Action.⁵⁶ Four of the modules were previously tested in our prior beta trial research, which provided evidence of the relevance of these topics to young adult nondaily smokers.⁴⁰ These modules focused on considering oneself a smoker versus the social stigma of being perceived as a smoker, secondhand smoke exposure as a burden to others, concurrent alcohol consumption and cigarette smoking, and likelihood of continued smoking or progression to regular smoking by graduation.²⁵ Additional modules focused on tobacco industry manipulation, coping with stress without smoking, dealing with lapses and relapses, and other topics.²⁵ There was also a module regarding other smoking cessation resources including pharmacotherapy options.

In addition, intervention participants were offered deals each time they completed the health behavior check-in, regardless of what they reported (ie, the incentive was for completing the module). The deals provided access to healthy goods and services (eg, massage therapy sessions, wall climbing entries, comedy tickets, health food discounts) from businesses close to their respective campus. Participants received coupons for either free goods and services or for discounts redeemable at the time of purchase or presentation to the business.

Control condition—Prior to beginning the program, control condition participants were notified that they would receive modules biweekly over the 6-week period including information regarding smoking cessation. The control condition involved 12 modules delivered bi-weekly over the 6-week period, with email contacts on Monday and Thursday each week prompting participants to complete the module. Control condition participants were sent to modules containing information cited from the ACS’s Guide to Quitting Smoking.⁶⁶ They did not receive the incentives or “daily deals” offered to the intervention group.

Measures

The screening survey included questions regarding health behaviors (ie, tobacco use, alcohol use, physical activity, nutrition) adopted from the Behavioral Risk Factor Surveillance Survey⁶⁷ and various other empirically validated tools. These measures are not used in the current analyses. For the current study, we analyzed data from the assessments at baseline (week 0), end-of-treatment (EOT; week 6), and 6-week follow-up (FU; week 12). These measures have been used in our previously published research.⁴⁰ Participants received a \$10 gift card for completing each assessment. Below, the data collected at each time point is specified.

Sociodemographics—Participants reported their age, sex, and race/ethnicity.

Process evaluation assessments—Intervention adherence and retention over the course of the trial and follow-up were recorded. Google Analytics⁶⁸ data were used to examine participant website interaction, including average time spent on the site, number of visits, and number of pageviews. To assess the intervention components, participants were asked the questions listed in Table 2 at end-of-treatment. Response options were “yes” or “no” for questions with dichotomous answers or on a scale of 0 to 4 for questions using Likert scales, with a 4 indicating more favorable attitudes. Finally, the commercialization potential of the incentive strategy was assessed (eg, number of deals earned and used).

Smoking behaviors—At each time point, participants were asked: “In the past 30 days, on how many days did you smoke a cigarette (even a puff)?” and “On the days that you smoke cigarettes, how many cigarettes do you smoke on average?”⁶⁹ At baseline, participants also were asked to report the age at which they smoked their first whole cigarette.

Smoking-related characteristics—To assess quit attempts at baseline, participants were asked: “During the past 12 months, how many times have you stopped smoking for one day or longer because you were trying to quit smoking?”⁷⁰ At EOT and FU, participants were asked: “During the past 6 weeks, how many times have you stopped smoking for one day or longer because you were trying to quit smoking?” This variable was dichotomized as having made at least one quit attempt versus not. Readiness to quit was assessed by asking: “What best describes your intentions regarding quitting smoking: never expect to quit; may quit in the future, but not in the next 6 months; will quit in the next 6 months; will quit in the next month; and already quit.”⁷¹ This variable was categorized as already quit, intending to quit in the next 30 days, and all other responses. Participants also were asked to indicate their level of confidence in quitting and motivation to quit on a 10 point scale (0 = “not at all” to 10 = “extremely”).⁷²

Data Analysis

Participant characteristics were summarized using descriptive statistics, and bivariate analyses were conducted using chi-square tests for categorical variables and ANOVA for continuous variables to examine differences between the control and intervention conditions at baseline (week 0), end-of-treatment (EOT; week 6), and 6-week follow-up (FU; week 12) in relation to sociodemographics, smoking behavior, and smoking-related variables. Process evaluation assessments were summarized as well, with across condition comparisons being conducted where appropriate. Finally, analyses examined cessation rates, quit attempts, readiness to quit at EOT and FU using binary logistic regressions as well as cigarettes per day (cpd) at EOT and FU using ordinary least squares regression. Our primary predictor of interest – condition assignment – was forced into the models, along with age, sex, race/ethnicity, and baseline smoking frequency (number of days smoked and cpd). We also conducted intent-to-treat analyses regarding EOT and FU cessation. Finally, we examined the relationship between dose of the intervention (ie, how many check-ins were completed) and smoking cessation or smoking reduction at EOT and FU. SPSS 21.0 was used for all data analysis. Statistical significance was set at $\alpha = .05$ for all tests.

RESULTS

Among the 122 participants, the average age was 21.16 years ($SD = 1.74$); 67.2% ($N = 82$) were women, 56.6% ($N = 69$) were white, and 17.2% ($N = 21$) were black (Table 1). At baseline, participants smoked an average of 14.32 ($SD = 11.71$) days of the past 30 days, with 67.2% ($N = 82$) being nondaily smokers. At baseline, 47.7% ($N = 53$) made a quit attempt in the past year, and 27.9% ($N = 31$) were ready to quit in the next 30 days. Randomization was largely successful, with the only significant difference between the 2 conditions being a higher proportion of Hispanic participants in the intervention versus control condition (14.3% vs. 3.6%, respectively).

Process Evaluation

Adherence and retention—Figure 2 displays the adherence rates (ie, % of participants completing the module) over the 6-week period in the 2 conditions. The intervention demonstrated 80% adherence until the final module, when it reached 73%. In the control condition, adherence decreased to 34% by the final module. Retention rates for intervention and control conditions at end-of-treatment assessment were 85.7% ($N = 54/63$) and 83.1% ($N = 49/59$), respectively, and at follow-up were 58.7% ($N = 37/63$) and 30.5% ($N = 18/59$), respectively.

Website utilization—The utilization of the websites per Google Analytics demonstrated results in favor of the intervention versus control condition (Table 2). Intervention participants spent more time on the site ($p = .04$), and there were more than twice as many visits and pageviews to the intervention condition site (p 's $< .001$).

Self-report measures—Table 2 presents process evaluation data. One of the unique components of the intervention condition was the self-monitoring of health behaviors (ie, physical activity, alcohol consumption, and smoking). Self-monitoring and seeing a graph of the health behaviors over time received better than average reports in terms of helpfulness, with 92.7% ($N = 51$) recommending keeping it in the program. The intervention condition messaging was outperformed by the control condition.⁶⁶ Moreover, the video messaging in the intervention also was not received particularly well; however, 61.8% ($N = 34$) recommended keeping the videos in the program. Across both groups, participants largely reported that the intervention was about the right length of time with about the right frequency of checkins. In addition, participants in the control condition reported greater influence on their confidence in quitting ($p < .001$). However, both groups reported high levels of satisfaction with the program, with roughly 90% reporting that they would recommend the program to friends.

Consumer assessments—Participants earned an average of 7.98 ($SD = 5.04$) deals, with 63.0% ($N = 34$) earning 10 deals. A total of 11.1% ($N = 6$) had redeemed one of the deals by the end of the trial, with 59.3% ($N = 32$) planning to use 1 deal. Overall, 55.6% ($N = 30$) learned about a new business through this program, and 37.0% ($N = 20$) told someone else about one of the companies in this program. Moreover, 37.0% ($N = 20$) reported a more favorable attitude toward the company because of its involvement. In addition, 42.6% ($N =$

23) reported the deals had influence on them engaging in the program, 33.3% (N = 18) reported the deals had influence on their health behaviors, and 90.7% (N = 49) recommended keeping the deals in the program.

Change in Smoking Behaviors

At EOT, the intervention participants less frequently reported having made a quit attempt since baseline (41.8% vs 63.3%, respectively, $p = .02$), but smoked fewer cpd ($p = .05$). An examination of the effects across nondaily smokers and daily smokers separately found no differences. The regressions indicated no effect of condition assignment on the outcomes of cessation, quit attempts, readiness to quit, or smoking level at either of the follow-up assessments. Despite few differences between the conditions, both showed some promise in terms of increasing cessation rates, with 16.3% (N = 8) of control condition participants and 20.0% (N = 11, $p = .47$) of intervention condition participants being abstinent at EOT, with 16.7% (N = 3) of control condition and 18.9% (N = 7, $p = .43$) of intervention condition participants being abstinent at FU. Moreover, both groups showed increases in readiness to quit and recent quit attempts at each follow-up. Finally, we found no relationship between dose of the intervention (ie, how many check-ins were completed) and smoking cessation or smoking reduction at EOT and FU.

DISCUSSION

This study tested an interactive online intervention using a novel incentive structure targeting college student daily and nondaily smokers. One of the major goals was to test novel ways to increase adherence and engagement in an online cessation treatment. This study is important for several reasons. First, it demonstrated the promise of using an incentive strategy of daily deals to increase engagement in online health promotion interventions. Second, it highlighted that there remains a great deal to be learned regarding how best to reach young adult smokers, particularly nondaily smokers.

Regarding feasibility, recruitment of individuals who met eligibility was a challenge. However, we were able to recruit 61% of those eligible for the study, which included a great proportion of college student smokers who were unlikely to identify as smokers (ie, nondaily smokers).⁹ In addition, high adherence and retention in the intervention condition also were achieved, indicating the promise of using this approach with a hard-to-reach population – young infrequent smokers. Moreover, utilization of the intervention versus control condition website, per Google Analytics data, indicated greater total visits and pageviews, demonstrating greater exposure to the intervention content.

However, retention was greatly reduced for the follow-up assessment at 12 weeks for both the intervention and control conditions. The trial launched the end of March 2013, the EOT was conducted in early May, and the FU assessment the end of June. Thus, issues related to the academic calendar may have had an impact on participants being less engaged in email during the summer. Moreover, follow-up calls from study staff documented problems with participants receiving the emails from the web-based survey administrator, likely due to server maintenance.

Regarding acceptability, process evaluation assessments indicated that, on average, participants deemed the tracking and graphing of physical activity, alcohol consumption, and smoking to be helpful. Despite the fact that monitoring behavior in and of itself can lead to improvements in health behaviors,⁷³ the health behavior change could not be attributed to its monitoring alone. Physical activity and alcohol consumption were not statistically different between the 2 groups at either follow-up assessment, with no differences from baseline to follow-up. Thus, the little change that we did see in smoking behavior likely was not due to self-monitoring of health behaviors. However, some of the intervention condition messaging and videos targeting change in smoking behavior require further examination to increase their relevance and potential engagement. Overall, 90% of participants in both conditions reported satisfaction with the programs, with a high proportion reporting that they would recommend the programs to friends who smoke. It is important to note in this context that our control condition was a robust one – the ACS’s Guide to Quitting Smoking. Using such a robust control may have reduced our ability to see the relative benefit of the newly developed program’s messaging approach, especially given that about one-third of participants were daily smokers who may have gleaned great benefit from the traditional strong cessation messaging.

In terms of changing smoking behavior, both conditions showed some promise in increasing cessation rates, with 16.3% of control and 20.0% of intervention condition participants being abstinent at EOT, and 16.7% of control and 18.9% of intervention condition participants being abstinent at FU. This shows trends in smoking cessation favoring the intervention condition; however, we may have been underpowered to detect significance. In addition, intervention participants smoked fewer cpd at follow-up compared to control condition participants. On the other hand, intervention participants reported less frequent quit attempts. However, it is important to note that measures of making a quit attempt in this population have inherent limitations due to the fact that nondaily smokers commonly refrain from smoking for at least 24 hours. Furthermore, both groups showed increases in readiness to quit and recent quit attempts at each follow-up assessment. This indicates that theoretical and psychosocial constructs that typically predict cessation^{74–78} may operate differently in young adult smokers or in nondaily smokers. These findings suggest the need to examine the relative contribution of these factors to the process of smoking cessation and reduction in this population.

Regarding the commercialization potential of the incentive structured used in the intervention program, participants earned an average of approximately 8 deals, with about 11% redeeming one of the deals by the end of the intervention period and approximately 60% planning to use at least one of the deals. In comparison, only 19% of Groupon subscribers have ever purchased a Groupon.⁷⁹ Additionally, 55% of our participants reported learning about a local business through this program, and 37% reported telling someone else about one of the companies providing a deal in this program. Moreover, 37% reported a more favorable attitude toward the company because it provided a deal in the program, and over 90% recommended keeping the deals in the program. Overall, this indicates that this program has promise for vendors proximal to college campuses in promoting their goods and services and building a favorable reputation with potential customers. Furthermore, over 40% reported the deals had influence on them engaging in the

program, and one-third reported the deals had influence on their health behaviors. Thus, this approach has appeal to public health practitioners for developing effective and sustainable programs to promote health behaviors and engagement in programs such as this.

Limitations

Some limitations exist. First, this was a small sample, limiting the overall power of the study and ability to conduct subsample analyses. In addition, the control condition was relatively robust – the ACS Guide to Quitting Smoking,⁶⁶ limiting our ability to detect benefits of the intervention. Also, the sample was drawn exclusively from 2 Southeastern universities, which limits generalizability to other parts of the country or to other groups of young adults. On a related note, this sample was largely women despite the fact that young adult men have a higher rate of smoking.⁸⁰ Greater efforts are needed to recruit and enroll young adult male college student smokers into cessation interventions. Another limitation was the lack of biochemical verification of smoking status or cessation, which was deemed outside the scope of this pilot trial. However, prior research indicates that self-report is largely accurate;⁸¹ moreover, given that participants were randomized to 2 treatment conditions with messaging regarding smoking cessation, differentially biased self-reports of cessation are unlikely. Finally, we did not assess contamination, ie, whether participants enrolled in the study had knowledge of others enrolled in the study or the nature of the other condition. However, the universities from which participants were recruited exceeded 10,000 and 30,000 students, respectively, mitigating that possibility.

Conclusions

This study suggests that an online intervention targeting factors specific to young adult smoking is feasible and acceptable and that greater engagement can be achieved by using an incentive strategy modeled after many current “deal of the day” programs. Additional research is needed to improve understanding of how to communicate with college student smokers, particularly nondaily smokers, and promote cessation among this population.

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Figure 1.
Flowchart of Participant Recruitment and Enrollment

Note.

* Missing data accounts for the difference between overall N surveyed and smoking prevalence estimates.

Figure 2.
Adherence Rates Over the 6-Week period (ie, 12 Total Modules) for the Control and Intervention Conditions

Table 1

Participant Characteristics and Bivariate Analyses Comparing Control and Intervention Conditions

Variable	Total N = 122 M (SD) or N (%) N = 122	Control N = 59 M (SD) or N (%) N = 59	Intervention N = 63 M (SD) or N (%) N = 63	p
Sociodemographics				
Age (SD)	21.16 (1.74)	21.16 (1.86)	21.16 (1.74)	.98
Sex (%)				
Male	40 (32.8)	19 (32.2)	21 (33.3)	
Female	82 (67.2)	40 (67.8)	42 (66.7)	.52
Race/Ethnicity (%)				
White	69 (56.6)	38 (64.4)	31 (42.9)	
Black	21 (17.2)	11 (18.6)	10 (15.9)	
Asian/Pacific Islander	9 (7.4)	3 (5.1)	6 (9.5)	
American Indian/Alaskan Native	1 (0.8)	0 (0.0)	1 (0.8)	
Biracial/Multiracial	13 (10.7)	5 (8.5)	8 (12.7)	
Other	9 (7.4)	2 (3.4)	7 (11.1)	.36
Hispanic (%)				
No	111 (91.0)	57 (96.6)	54 (85.7)	
Yes	11 (9.0)	2 (3.4)	9 (14.3)	.04
Cigarette Consumption, past 30 days				
Days of smoking (SD)	14.32 (11.71)	15.03 (11.70)	13.65 (11.78)	.52
Smoking frequency (%)				
Nondaily	82 (67.2)	38 (64.4)	44 (69.8)	
Daily	40 (32.8)	21 (35.6)	19 (30.2)	.33
Average cigarettes per day on smoking days (SD)	3.86 (3.61)	4.19 (3.94)	3.56 (3.27)	.34
Average of first whole cigarette (SD)	16.53 (2.26)	16.52 (2.05)	16.54 (2.47)	.97
Quit attempt in the past 12 months (%)				
No	58 (52.3)	25 (47.2)	33 (56.9)	
Yes	53 (47.7)	28 (52.8)	25 (43.1)	.20
Readiness to quit in next 30 days (%)				
No	80 (72.1)	37 (69.8)	43 (74.1)	
Yes	31 (27.9)	16 (30.2)	15 (25.9)	.38
Motivation to quit (SD)	7.01 (3.45)	7.29 (3.32)	6.72 (3.57)	.76
Confidence in quitting (SD)	8.05 (2.80)	8.06 (2.89)	8.04 (2.73)	.28

Table 2

Process Evaluation Outcomes at Week 6 Examining Responses and Outputs of Control and Intervention Participants

Variable	Control Mean (SD) or N (%)	Intervention Mean (SD) or N (%)	p
Web utilization			
Average time on the site (Mins:Secs)	1:03	1:09	.04
Average visit duration			
0–10 seconds	546	1420	
11–30 seconds	178	231	
31–60 seconds	145	348	
61–180 seconds	122	485	
181–600 seconds	65	188	
601–1800 seconds	19	52	
1801 or more seconds	2	4	<.001
Average time per page (Mins:Secs)	0:49	0:51	.07
Number of visits	1,077	2,728	<.001
Number of pageviews	3,197	6,467	<.001
Participant assessments			
How helpful was it to track your own smoking, alcohol use, and physical activity over time?	--	2.38 (0.99)	--
How helpful was it to see a graph of your smoking, alcohol use, and physical activity over the course of the program?	--	2.38 (1.14)	--
How much influence do you think reporting and tracking your behaviors over time had on your smoking, drinking, and physical activity?	--	2.20 (1.28)	--
*Would you recommend keeping this in the program?	--	51 (92.7)	--
How much of the reading material did you read?	3.22 (1.07)	1.82 (1.38)	<.001
How relevant was the material to you?	2.61 (0.99)	1.78 (0.98)	<.001
How interesting or engaging were the messages?	2.47 (1.12)	1.80 (1.03)	.002
*Would you recommend keeping these messages in the quit smoking program?	43 (79.6)	38 (77.6)	.34
How much of the videos did you watch?	--	1.13 (1.27)	--
How relevant was the video content to you?	--	1.13 (1.11)	--
How interesting or engaging were the videos?	--	1.29 (1.26)	--
*Would you recommend keeping the videos in the quit smoking program?	--	34 (61.8)	--
How did you feel about the length of the program?			
Too short	5 (10.2)	2 (3.7)	
About right	34 (69.4)	47 (87.0)	
Too long	10 (20.4)	5 (9.3)	.09
How did you feel about the frequency of the check-ins?			.74
Too few	4 (8.2)	4 (5.6)	
About right	33 (67.3)	40 (74.1)	
Too many	12 (24.5)	11 (20.4)	
How much influence did the program have on your motivation to quit?	2.37 (1.22)	1.89 (1.40)	.07

Variable	Control Mean (SD) or N (%)	Intervention Mean (SD) or N (%)	p
How much influence did the program have on your confidence to quit smoking?	2.49 (1.16)	1.63 (1.36)	.001
Overall, how satisfied were you with the program?	2.78 (0.93)	2.72 (0.90)	.96
*Would you recommend participating in this program to your friends who smoke?	44 (89.8)	49 (90.7)	.57
Deals			
Number of deals earned (SD)	--	7.98 (5.04)	--
Participants earning 10 deals (%)	--	34 (63.0)	--
Number of deals redeemed (SD)	--	0.39 (1.28)	--
Participants redeeming 1 deal (%)	--	6 (11.1)	--
Number of deals planned to be used (SD)	--	3.00 (4.29)	--
Participants planning to use 1 deal (%)	--	32 (59.3)	--
Participants who learned about a new business (%)	--	30 (55.6)	--
Participants who told someone about a business providing deal (%)	--	20 (37.0)	--
Effect of business providing deals on attitude toward business (%)			
Less favorable		4 (7.4)	
No change		30 (55.6)	
More favorable	--	20 (37.0)	--
At least some influence of deals on engaging in program (%)	--	23 (42.6)	--
At least some influence of deals on health behaviors (%)	--	18 (33.3)	--
Recommend keeping deals in the program	--	49 (90.7)	--

Note.

Scale items are on a scale of 0 to 4 with higher ratings indicating more favorable attitudes.

* % reporting "yes"

Table 3

Bivariate Analyses Comparing Control and Intervention Participants at Weeks 6 and 12

Variable	Week 6			Week 12		
	Control Mean (SD) or N (%)	Intervention Mean (SD) or N (%)	P	Control Mean (SD) or N (%)	Intervention Mean (SD) or N (%)	P
Smoking Characteristics						
Days of smoking, past 30 days (SD)	14.02 (12.41)	14.47 (12.62)	.85	16.56 (12.92)	14.05 (12.30)	.49
Smoked in the past 30 days (%)						
No	8 (16.3)	11 (20.0)		3 (16.7)	7 (18.9)	
Yes	41 (83.7)	44 (80.0)	.41	15 (83.3)	30 (81.1)	.58
Ave. cpd on smoking days (SD)	4.63 (4.44)	3.25 (2.87)	.05	3.94 (3.73)	3.16 (3.06)	.41
Quit attempt in past 6 weeks (%)						
No	18 (36.7)	32 (58.2)		8 (44.4)	18 (48.6)	
Yes	31 (63.3)	23 (41.8)	.02	10 (55.6)	19 (51.4)	.49
Readiness to quit in next 30 days (%)						
No	24 (49.0)	35 (63.6)		12 (66.7)	23 (62.2)	
Yes	10 (20.4)	6 (10.9)		2 (11.1)	3 (8.1)	
Already quit	15 (30.6)	14 (25.5)	.25	4 (22.2)	11 (29.7)	.82
Motivation to quit (SD)	6.76 (3.36)	6.20 (3.52)	.41	7.39 (2.68)	6.08 (3.50)	.17
Confidence in quitting (SD)	8.39 (2.39)	7.44 (2.95)	.08	7.17 (2.31)	7.43 (3.14)	.75

Note.

Retention rates for control and intervention conditions at end-of-treatment assessment were 83.1% (N = 49/59) and 85.7% (N = 54/63), respectively, and at follow-up were 30.5% (N = 18/59) and 58.7% (N = 37/63), respectively.

Using Intent-To-Treat analyses, no statistical differences were found in quit rates among the groups (EOT: 13.6% vs. 17.5%, p = .37; FU: 5.1% vs. 11.1%, p = .19, respectively for the control and intervention groups)