Title

A mixed-methods study of young adults' receptivity to using Facebook for smoking cessation: If you build it, will they come?

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RUNNING HEAD: FACEBOOK FOR SMOKING CESSATION

A mixed-methods study of young adults' receptivity to using Facebook for smoking cessation:

If you build it, will they come?

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Abstract

Purpose: To determine whether young adults are interested in a Facebook intervention for smoking cessation and to inform the design of such an intervention.

Design: Mixed-methods.

Setting: Participants throughout the United States were recruited through Facebook.

Participants: Young adults age 18 to 25 who had smoked at least once in the past month.

Method: Participants (N=570) completed an online survey of tobacco and social media use. A subset of 30 survey completers, stratified by motivation to quit smoking, agreed to participate in a structured interview over online chat. Themes were identified using grounded theory.

Results: About a third of the full sample (31%) reported they would want to get help to quit smoking using Facebook. Interest in using Facebook to quit was greater among those more motivated to quit (χ^2=75.2, *p*<.001), who had made a quit attempt in the past year (χ^2=16.0, *p*<.001), and had previously used the Internet for assistance with a quit attempt (χ^2=6.2, *p*=.013). In qualitative interviews, social support and convenience were identified as strengths of a Facebook intervention; while privacy was the main issue of concern.

Conclusion: Nearly one in three young adult smokers on Facebook expressed interest in using Facebook for quitting smoking. Social media approaches that respect privacy and tailor to readiness to quit are likely to maximize participation.

Keywords: smoking cessation, young adults, social media, Facebook

Smoking control; Strategy: Behavior change; Target population age: Young Adults; Target

population circumstances: All young adult tobacco smokers.

Purpose

Although the prevalence of cigarette smoking has been slowly declining since the 1970s,

the smoking prevalence among young adults aged 18–25 years has remained stable and higher

than other age groups, with past month cigarette use at 32% in 2012.[1] Compared to other age

groups, young adults are less likely to use behavioral or pharmacotherapy interventions for

smoking cessation,[2] and studies of tobacco use have reported great challenges in recruiting young

adults.[3, 4] Reaching the US public health goals of cutting the smoking rate to no higher than 12%

by 2020[5] will require novel approaches to reach and intervene with young adult smokers.

For reaching young adult smokers, the Internet is a particularly promising strategy.

Almost all (94%) young adults in the US use the Internet, and young adults are the age group

most likely to go online.[6] Online smoking-cessation strategies have reached large samples of

smokers.[7] However, as online interventions have been associated with large drop-offs in

engagement of smokers,[8, 9] strategies are needed to increase demand for and sustained

engagement in online interventions for young adults.

Online social networks may serve as a solution to the problems of reach and engagement

in smoking cessation interventions for young adults. Social networks, including those developed

through online social media, play a well-established role in onset and perpetuation of smoking

behavior.[10-12] Social network science has helped to explain how diffusion of information among

members of a social network can also influence a broad range of behavioral and emotional

changes including smoking cessation.[13-15] Social networks in the form of peer email support have

been successful at influencing engagement in online smoking cessation intervention that could

lead to quitting.[16, 17] Further, patterns of social interactions through online smoking cessation

forums have characterized ways that social networks can influence smoking cessation through

social support, including by offering encouragement and emotional support, stories,

congratulations, "thank you" messages, giving practical advice and tips, and discussing nicotine

replacement therapy.[18, 19] With wide reach and engagement among users, social media websites

(e.g., Facebook, GooglePlus) offer phenomenal opportunity to use social interactions to engage

young people in behavior change interventions and to foster socially supportive communities that

can help each other quit smoking and maintain abstinence.

The reach of social media among young adults is vast. Over three-quarters (83%) of

online 18-29 year olds use social-networking websites, with 70% doing so on a typical day.[20, 21]

Facebook is the 2nd most popular website in the US,[22] with over 1.15 billion monthly active users

and 699 million daily users as of June 2013.[23] Facebook has been the source of numerous wide-

reaching public health campaigns targeting smoking among young people. For example the

American Legacy Foundation's national truth® campaign had over 2 million "Likes" on its

Facebook page as of October 2013, and according to Facebook data, was most often mentioned

directly in any type of communication on Facebook by 18-24 year olds compared to other age

groups.[24] Further marketing campaigns on social media offer the opportunity to target only those

who have identified within a certain age range (e.g., 18-25 years old) and/or have indicated

interest in behaviors such as smoking, making Facebook a promising mechanism to target young

adult smokers for cessation programs.[25] However, the use of social media including Facebook to

intervene with young adult smokers has yet to be evaluated.

The US Senate Appropriations Committee has called for the NIH to support research

using social media,[26] and the technology industry has recognized the potential of Facebook to

change health behaviors.[27] Some work has examined the feasibility, engagement, and efficacy of

using Facebook to deliver health behavior change interventions in areas other than smoking. A

randomized controlled trial testing the efficacy of a physical activity intervention combining

education, a self-monitoring tool, and a Facebook group versus education alone found that

participants were satisfied with their use of a Facebook group and participation was higher

compared to other online support mechanisms.[28] A study of adolescents and young adults (ages

15-24) who accessed a Facebook site that disseminated sexually transmitted disease education

reported a 23% increase in condom utilization.[29] In a randomized controlled evaluation of

Facebook for disseminating information on condom adoption, Bull et al.[30] enrolled 1578

adolescents and young adults in the U.S. (ages 16-25) and reported their Facebook page had 43

unique visitors per week during the intervention period and approximately 10% of the

intervention's 942 participants regularly posted to the Facebook page. Three quarters of the

sample completed at least one follow-up assessment, and participants in the intervention group

more consistently used condoms than controls at 2 months follow-up (68% vs. 54%). Napolitano

et al.[31] found that an 8-week intervention for college students that included a Facebook page, text

messaging, and personalized feedback resulted in greater weight loss than a Facebook-only or

wait-list control group.

It is unknown whether young adult smokers will be receptive to a Facebook intervention

targeting tobacco cessation. Given the strong addictive potential of nicotine[32] that often

necessitates both behavioral and pharmacologic intervention,[33] and less likelihood among young

adults to identify as "smokers" [34] or seek treatment for smoking cessation,[2] there may be some

unique challenges to engaging young adults in a smoking cessation intervention using Facebook.

We have had good success with recruiting young adult smokers through social networking websites and other online resources for participation in one-time survey studies.[25, 35] In 9 months time, we recruited and surveyed 1987 young adult smokers; about half of whom wanted to quit smoking in the next 6 months. Among smokers who were motivated to quit, one in four expressed interest in a cessation intervention administered through the Internet. Thus, there appears to be some interest in online interventions targeting young adult smokers. The specific format, process and content of online interactions for smoking cessation, however, are largely unshaped; and efforts to increase the perceived attractiveness and utility are needed. In particular, ideas are needed on how best to leverage and optimize young adults' experiences with and use of social media for health behavior change efforts such as quitting smoking.

Mixed-methods study designs, combining quantitative and qualitative data, provide unique benefits over single-method designs[36, 37] and may yield a fuller understanding of complex phenomena such as receptivity to intervention through social media.[38] Quantitative data can reveal patterns of health behavior and Internet use, while qualitative data are beneficial for identifying the lived experience of the target audience and their receptivity to specific aspects of an intervention.

The present study combined qualitative and quantitative methods to answer the following three research questions: 1) Are young adults interested in a smoking cessation intervention through Facebook?; 2) Should a Facebook intervention be targeted to a particular type of smoker?; and 3) How exactly can/should Facebook be used to help young adults quit smoking?

Design

This mixed-methods research was conducted in two phases. In Phase I, quantitative data were gathered from young adults who completed an online survey. In Phase II, qualitative interviews were conducted online with a subsample of survey respondents.

Setting

The study (Phases I and II) was conducted entirely online.

Participants

Participants were young adults between the ages of 18 and 25, who were English literate, and reported smoking at least one cigarette in the past 30 days. Advertisements on Facebook invited young adults to participate in a 20-minute online survey with a chance to win a prize in a drawing (worth $100). Advertisement text and images were targeted to tobacco smokers (e.g., picture of a pack of cigarettes or person smoking; text that read "Ever smoke?"). The campaign ran for two 5-month periods, from 9/27/10 to 2/8/11 and again 4/28/11 to 9/26/11, with the break due to a two-month lapse in recruitment funds. Advertisements contained a hyperlink that directed potential participants to: 1) the study's University of California, San Francisco IRB-approved consent form that included verification questions to determine understanding of the consent process; and 2) a screener for determining eligibility including English literacy, age (18 to 25), and past month cigarette smoking (y/n).

Method

Data Collection: Quantitative

Participants who consented and were deemed eligible were asked to complete a demographic questionnaire and measures of tobacco and Internet use and receptivity to using social networking websites for smoking cessation. The survey was anonymous, and data were encrypted for added security protection. Participants were required to answer all questions before

they could continue to the next page of the survey, but could quit and return to the survey at any time. Computer IP addresses were tracked and only one entry was allowed from a single computer to prevent duplicate entries from the same person; however, multiple entries were allowed from the same Internet connection (dormitories, apartment buildings). Eligibility checks excluded respondents who: 1) had discrepant data on similar demographic questions (e.g., date of birth and age indicating they were either too young or too old to participate); 2) reported the same email address across multiple survey entries; 3) had clearly invalid data (e.g., every entry was the same across the entire survey).

The demographic and tobacco use measures in the current study were previously analyzed with young adult smokers using anonymous online survey methods and demonstrated good reliability and validity.[39, 40]

Sociodemographics. Gender, age, race/ethnicity, student status, employment status, annual personal and family income, and highest parental level of education were assessed. Residential zip codes were used to categorize participants as residing in: 1) one of four U.S. Census Regions: Northeast, Midwest, South, and West;[41] and 2) an urban or rural area, using zip code approximations of rural-urban communing area data from the 2000 census in a coding system made public by the University of Washington Rural Health Research Center.[42]

Cigarette smoking behavior. We assessed participants' average number of cigarettes smoked per day, days smoking per week on average (from which we computed percent smoking 7 days per week as "daily"), age of initiation of smoking, years of smoking, prior quit attempts (lifetime and past year), and strategies used to aid a prior quit attempt including Internet-based strategies.[43] Time to first cigarette upon waking (<30 min or >30 min), with good psychometric properties, was used as a measure of dependence.[44] One item assessed self-identified social

smoking, "Are you a social smoker?" (y/n). The 3-item Tobacco Smoking Stages of Change

Questionnaire assessed motivation to quit,[45] categorizing smokers into one of three pre-action

stages of change (Precontemplation: no intention to quit within the next 6 months;

Contemplation: intention to quit within the next 6 months but no 24-hr quit attempt in the past

year; Preparation: intention to quit within the next month and a 24-hr quit attempt in the past

year).

Social networking use. The frequency of social media use, sites visited most often, and

ways in which individuals use social media were assessed using questions from a recent survey

conducted for the Pew Internet and American Life Project.[46, 47] Some questions were adapted to

specifically address Facebook usage and trends, including assessing for usage frequency, modes

of communication, and use of Facebook applications ("apps"). This measure is available upon

request from the first author.

Likelihood of using social media for smoking cessation. A measure was developed for

the present study to assess participants' likelihood of using social media for smoking cessation

and likelihood that they would take advantage of specific features of such an intervention (e.g.,

chat rooms, links to others who are also trying to quit smoking, links to other resources).

Analysis Strategies: Quantitative

Descriptive statistics were used to examine sample characteristics and patterns of

tobacco, Internet, and social media use. To evaluate whether young adults were interested in

using Facebook to quit smoking, we looked at frequencies of reports of intentions to use

Facebook and intentions to use specific Facebook communication strategies. To evaluate whether

a Facebook intervention should be targeted to a particular type of smoker, ANOVA and chi-

square analyses examined relationships between Internet use variables (frequency of Internet use,

frequency of Facebook use, previous quit attempts using the Internet, and intention to use FB to

quit smoking) and smoking variables (average cigarettes per day, average days smoking per

week, daily smoking status, smoking within 30 minutes of waking [y/n], age of first cigarette,

total years smoked, past year quit attempt [y/n], stage of change [precontemplation,

contemplation, preparation], and self-identification as a social smoker [y/n].

Data Collection: Qualitative

Upon completing the online survey, all participants were asked if they were interested in

completing a one-hour online interview about their smoking and Internet behaviors at a later

time. Those who agreed were screened for stage of change and then contacted by email to

schedule an interview through meebo.com, an online instant messaging service. To obtain

representation from each stage of change (precontemplation, contemplation, preparation),

participants were contacted for scheduling in order of survey completion until 10 participants

completed interviews from each stage (N=30 interviews). Scheduled participants were provided

with a username and a unique password for their interviews.

A semi-structured interview guide was developed for the current study that asked

participants more detailed questions about their smoking behavior, identity, and quitting (e.g.,

"Do you see yourself as a smoker or something else?," "What do you think would need to be

different for you to quit forever?"), general thoughts about a smoking cessation program

administered through Facebook (e.g, "How would your Facebook friends react if they knew you

were trying to stop smoking?"), and their willingness to perform specific activities on Facebook

that support smoking cessation and how they might benefit from those activities (e.g., "Would

you download a Facebook app that would help you quit smoking? What do you think you would

get out of that?"). After half of the interviews had been completed, data were loosely examined

and based on recurring themes of quit attempts and online privacy, questions were added to the

interview guide to assess detailed experiences with quit attempts and views on online privacy.

Recruitment continued until information was saturated as determined by the first author.

Analysis Strategies: Qualitative

Two research staff members independently coded the interview transcripts using two

major types of coding. For specific types of communication on Facebook, responses were

initially open-coded and valence was coded for each type of communication participants were

asked about (*positive*, *negative*, or *ambivalent*). Next, using a Grounded Theory approach,[48]

major themes on any topic were identified from the interviews and grouped into concepts around

using Facebook to quit smoking. This process was facilitated by using ATLAS.ti, a qualitative

data analysis software for organizing open coding.[49] A tentative list of codes was developed by

one of the coders and the first author based on the semi-structured interview. The coders began

coding the interviews with this list and added new codes as more themes became apparent. Once

complete, the coded interviews were compared and discussed with the first author and discrepant

codes were resolved.

Results

Survey

Sample characteristics. The online survey received more than 3483 hits and 975 people

gave online consent to determine eligibility to complete the survey. Of those, 718 (74%) met

criteria and 39 (5%) were deemed invalid, leaving 679 (70%) eligible and valid cases. Of those,

646 (95%) completed the demographic items, 594 (87%) completed the smoking items, and 570

(84%) completed the entire survey. Compared to those who only completed demographic items

(n=76), survey completers were more likely to be female (29.8% vs. 17.1%, $\chi^2 = 5.34$, $p = .021$)

but did not differ on any other demographic characteristic. Compared to those who only

completed the smoking items (n=24), survey completers were less likely to be daily smokers

(70% vs. 88%, χ^2 = 4.48, p = .043), smoked fewer cigarettes per day on average (6.0 vs. 6.8, t =

-2.86, p = .004), and were less likely to smoke their first cigarette within the first 30 minutes of

waking (42% vs. 56%, χ^2 = 10.57, p = .014). Data analyses were restricted to those who

completed the entire survey (N = 570). Sociodemographic and smoking characteristics of the

sample are summarized in Table 1.

Cigarette smoking behavior. On average, the sample smoked 10.3 cigarettes per day

(SD = 8.2), first tried smoking at age 14.5 (SD = 3.0), smoked for 3.7 years (SD = 2.8), 42%

smoked within 30 minutes of waking, 70% were daily smokers, and 65% identified as a social

smoker. A little over half the sample (57%) made a quit attempt in the past year, 2% had

previously used the Internet to quit smoking, and 43% indicated they were intending to quit

smoking in the next six months (Contemplation or Preparation).

Internet/Social media use. Internet use and social media use behaviors of young adults

recruited through Facebook are reported in Figure 1. A large proportion of the sample (85%)

used the Internet multiple times a day, and an equally large proportion (87%) visited Facebook

daily. More than half of the sample (57%) used their cell phones to browse or update their

Facebook profile. Participants reported how they communicated using Facebook with the three

most common communication strategies being: posting comments on their friends' walls/pages

(70%), adding comments to their friends' pictures (64%), and sending private messages through

Facebook (63%). About a quarter of the sample (27%) downloaded one or more Facebook

applications ("apps") in the past month and a similar proportion (27%) used one or more

Facebook apps regularly. More than half the sample (65%) had profiles on two or more social networking websites.

Intention and strategies to cut down/quit smoking using social media. About a third of all participants (31%) reported they would like help to cut down or quit smoking using social media, and 56% of those ready to quit indicated they would use social media to quit. Specific strategies and proportions reporting likely use included: general resource about smoking/quitting (30%), personalized messages (28%), downloading an app for quitting (26%), making new FB friends with similar issues around smoking (26%), status updates (19%), downloading an app for information about smoking and health (17%), wall postings (15%), and other (26%).

Relationships between motivation to quit, smoking characteristics and interest in Facebook for quitting smoking. Interest in using Facebook to quit smoking in the future was greater among those with greater motivation to quit smoking (17.1% precontemplation < 48.1% contemplation < 56.1% preparation; $\chi^2 = 75.2$, $p < .001$), those who had made a quit attempt in the past year (38.2% vs. 22.4%, $\chi^2 = 16.0$, $p < .001$), and those who had previously used the Internet for assistance with a quit attempt (66.7% vs. 28.6%, $\chi^2 = 6.2$, $p = .013$). No other smoking variables were associated with intention to quit smoking by using Facebook.

Qualitative Interviews

Of the 570 respondents who completed the survey, 395 indicated they would be interested in completing a follow-up interview, 219 were contacted for scheduling, 59 responded, and 30 of those were interviewed (10 in each stage of change). Sample characteristics are presented in Table 1. Compared to the full sample ($N = 570$), the qualitative interview respondents were more likely to identify as Asian or multi-ethnic and less likely to be African-American or Hispanic (χ^2

= 13.5, p = .019). They were also less likely to smoke their first cigarette of the day within 30

minutes of waking (χ^2 = 9.11, p = .028) and were more ready to quit smoking (65.5% ready to

quit in the next 6 months vs. 42.5%; χ^2 = 8.01, p = .018). No other demographic or smoking

variables differed.

First, specific quotes were organized by *General reactions to a Facebook intervention*

and six specific ways of communicating on Facebook, quotes were coded for valence, and

frequencies were counted for each communication type (Table 2). Valence reflected positive,

negative, and ambivalent/neutral responses. More detailed descriptions and sample quotes are

presented below, with all quotes followed by interviewee sex, age, and stage of change

(precontemplation, contemplation, or preparation) and in Table 2.

General reactions to using a Facebook intervention were more positive than negative and

ambivalent. Some thought Facebook could be supportive yet less invasive than the real world,

with one participant noting "It'd be great for people who just need to know that they aren't the

only one quitting, or that people support their decision without feeling pressured to quit (since

family can be pretty pushy and it sucks to hide things from your family)…" (female, age 22,

preparation)**.**

We asked participants their opinions about various types of Facebook interactions. There

were far more positive than negative quotes about a *page that actively helps with quitting* (77%

positive quotes), receiving *personalized messages* to help them quit smoking (78% positive

quotes), and being asked to *update their Facebook status* about quitting smoking (70% positive

quotes). One participant suggested "one article a day max and not very long but 'rich'" (male,

age 20, contemplation**).** Concerns about these strategies reflected ambivalence about quitting in

general such as "I don't like being nagged, and even though it would be well intentioned, I would feel pressured, and I tend to push against being pressured…" (male, 22, precontemplation).

There was also general enthusiasm for an intervention through a Facebook *application* ("*app*") that would have to be downloaded to participants' Facebook pages (63% positive quotes). Positive comments reflected the convenience of an application such as "..I think it'd be a helpful reminder to stay on track" (female, 20, precontemplation). Negative comments reflected concerns about applications and privacy. One participant noted "I'm a little reluctant on the app because some of them can be intrusive and post things without your permission" (male, 20, precontemplation*)*. Participants were generally ambivalent about receiving *posts on their Facebook walls* about smoking (52% positive quotes, 35% negative, and 13 neutral), with specific concerns about repetition. For example, one participant noted "I'd ignore it if it was repetitive, the same info, the same picture, the same plot, but I guess there could be something different every time so you're curious and want to click on it and read more" (female, 19, contemplation).

Participants were asked whether they would be interested in using other websites than Facebook to quit smoking. Comments tended to support Facebook as a more interesting and/or convenient approach to smoking cessation (51% of quotes supported using Facebook over other websites, 33% were partial to other websites, and 15% of quotes were ambivalent). For example, one participant noted, "If I did want to quit, I would go to other websites. They probably would not be as effective though, because they are not social networking sites where you can get immediate support from others" (male, 18, precontemplation). Another participant who was hesitant about using other websites said "I think that a website would be more impersonal than

using FB. Using FB as a means to quit would be more beneficial since the social aspect is there"

(male, 24, precontemplation).

In addition to valence codes for types of communication on Facebook, four unique

themes were identified around using Facebook to quit smoking including *social support, privacy,*

convenience of Facebook, and inconvenience of other websites (see Table 3 for theme counts,

subthemes, and sample quotes).

Social support was identified as a strength of a Facebook intervention. The shared

experience of quitting was an important aspect of the support, with one participant noting "I

enjoy the whole working as a team type environment. If there's victory (quitting) in the end,

we're all satisfied" (male, 20, precontemplation). Negative comments about social support

related to smoking being the focus of the social support. One participant noted, "I feel like

forming a group centered solely around smoking would be a little uncomfortable" (male, 22,

precontemplation).

Two major themes arose about the uniqueness of Facebook as a medium to deliver health

behavior change intervention: *convenience* and *privacy*. Facebook was generally viewed as

convenient. The ease of access to an intervention in addition to other social material was

identified as a strength of Facebook. One participant noted "FB is just convenient because I'm

there so often and updates to the page would be on my home page feed, so I could keep track of

that as well as creep on my friends" (female, 22, preparation). Another participant referred to a

Facebook intervention as "one stop shopping" because "they can socialize with friends, and work

on quitting" (20, female, contemplation." Many saw *privacy* as a concern, especially as it related

to smoking behavior reported on Facebook. One participant with concerns said "One of the

things that's always hardest for me with quitting smoking is the outside pressure to quit, and I

don't want something spreading the information around about my cigarettes. I'd like to keep it a

little more controlled and private" (male, 22, precontemplation). In contrast, those who did not

have concerns were comfortable with the social nature of Facebook. One participant, though not

currently motivated to quit smoking, stated "If I were quitting smoking, I wouldn't care if it was

the most public thing of my life. That's not something worth keeping private. It's something to

be proud of" (male, 20, precontemplation).

Conclusion

Applying a mixed-methods approach, this study evaluated young adults' receptivity to

using Facebook for smoking cessation. Our findings indicated that a Facebook intervention could

reach and appeal to young adult smokers across all smoking severities who use Facebook,

though interest was greater among those more interested in quitting and with recent evidence of

attempts to change or quit their smoking. The findings suggest the value of tailoring to readiness

to quit in designing a Facebook intervention to appeal to the widest group of young adult

smokers. Incentives for participation also may be useful to spur engagement and retention, as

well as gaming activities and those that emphasize socializing.

Survey results and qualitative interviews yielded suggestions as to the most successful

strategies for intervening with young adults using Facebook. An intervention designed directly

through Facebook may reach more young adults than an application that would have to be

installed due to privacy concerns. Some participants reflected concern about sharing information

with a third party application. Further, apps are much less popular than Facebook itself, with the

most popular app on Facebook used by about 2% of daily active users in February 2013,[23, 50] and

only a quarter of the sample in the present study being recent Facebook app users. An

intervention through Facebook also was largely favored over using another website as it is

already so well integrated into young adults' lives. Specific strategies that were particularly

appealing were personalized messages sent to participants and updating their Facebook status as

a way to get support for quitting smoking. Participants emphasized that the intervention not be

boring or repetitive. Thus, an intervention that varies the content and maximizes the supportive

environment that social media can provide while giving participants opportunities to keep their

disclosures private if they would like would be ideal. Private groups on Facebook made up of

participants with similar smoking characteristics (e.g., severity, motivation to quit) could both

support social interaction and respect privacy concerns. Although not mentioned often in

qualitative interviews, survey data indicated that over half of participants used their cell phones

to browse the Internet or update their Facebook social media status, indicating that a Facebook

intervention should be fully accessible using mobile technology.

Consistent with previous findings that young adults can be engaged in online health

behavior change interventions that are not delivered through social media,[16, 17] our qualitative

data showed some enthusiasm for using other websites than Facebook to quit smoking. However,

very few (2%) respondents in our online survey had ever used the Internet to quit smoking. This

is consistent with recent data that less than 1% of adult smokers in England had used the Internet

to aid a quit attempt in the past year despite 47% reporting an interest in doing so.[51] Consistent

with our findings, adults who were more motivated to quit were also more likely to report an

interest in using the Internet to quit smoking. Findings by Brown et al. and in the present study

underscore the importance of using tailored outreach approaches to engage motivated smokers to

participate in Internet interventions and to engage unmotivated smokers to quit. Bringing health

promotion interventions to social media that is so well integrated into the daily lives of many

young adults could be engaging.

There were some differences in the online behavior reported here compared to US data.

Post-hoc comparisons were made between prevalence of various Internet and social media

behaviors in our sample (smokers recruited through Facebook) to teen and adult surveys

conducted by the Pew Internet and American Life Project using phone sampling.[52, 53] Our sample

showed higher prevalence than teens and lower prevalence than adults for using the Internet to

get news, make online purchases, and look up health information, likely reflecting

developmental differences in financial independence and health concerns. Our sample was more

likely to use Twitter than the Pew samples of either teens or adults, and exhibited a greater range

of social media behaviors than teens, suggesting that intervention strategies that incorporate

multiple forms of social media and interaction tools may be particularly successful with young

adult smokers. However, given that our survey used Facebook for recruitment, we are not able to

generalize to the entire population of young adults in the United States.

This work on the literature suggests guidelines for developing successful online health

promotion activities. A meta-analysis of 85 online interventions found those most successful

were strongly based in theory and provided tailored messaging to individual audiences.[54]

Similarly, Fry and Neff found positive results through tailoring prompts through regular contacts

with a counselor.[55] Social media offers additional opportunity over traditional Internet platforms

to interact over multiple channels, share messages with many different types of social networks,

and is extremely engaging to users. Our work suggests that a Facebook intervention that tailors

to motivation to quit while attending to protection of privacy is likely to maximize engagement.

Study limitations include the use of self-reported data that could be subject to recall bias. In addition, social media (and Facebook in particular) is changing rapidly such that new features of Facebook communication (e.g., posting on an individual's timeline, increased ease of using video) and thus intervention have become available since the data were collected. We were not able to assess receptivity to some of these newer features of Facebook. Further, we acknowledge that although a sizable minority of young adults indicated an interest in using Facebook to change smoking behavior, formal study is needed to confirm to what extent young people would use and engage in a smoking cessation intervention through Facebook. Nonetheless, it is clear that there is interest in an intervention that uses Facebook for smoking cessation.

The present study demonstrates an interest in and provides a framework from which to develop a social media intervention for smoking cessation targeted to young adults. Social media intervention, methods to track its engagement and efficacy, and costs and benefits of this method as a health promotion tool are in their infancy.[56] As such, this formative work is fundamental to broaden our understanding of what might work for whom. Then theory-based interventions can be most effectively adapted for delivery over the powerful tool that social media represents.

SO WHAT?

What is already known on this topic? Young adults use social media more than any other age group. Social media websites such as Facebook have shown promise in changing health behavior. Yet little is know about how to engage young adults in a smoking cessation intervention using Facebook.

What does this article add? In a mixed-methods design, we found young adults would be interested in a smoking cessation intervention using Facebook with recommendations that it be tailored to motivation to quit and provide options for keeping interactions private.

What are the implications for health promotion practice or research? Social media presents a generally untapped strategy to help young adults quit smoking. Because young adults are less likely than other groups to take advantage of traditional smoking cessation aids, social media, including Facebook could be a means of reducing tobacco use among young people.

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Figure Captions

Figure 1a. Internet behaviors of young adult smokers. Error bars represent standard errors.

Figure 1b. Social media behaviors of young adult smokers. Error bars represent standard errors.

Table 1. Sociodemographic characteristics of young adults smokers who completed the online survey ($N = 570$) compared to the subset that also completed the online interview ($n = 30$)

Variable	Full sample ($N = 570$)	Interviewees ($n = 30$)	χ^2 / t	p-value
Age (M [SD])	19.9 (1.8)	20.3 (1.7)	-1.40	.163
Gender (% female)[a]	29.8	40.0	1.54	.223
Ethnicity			13.47	.019
African-American	2.6	0.0		
Asian-American/Pacific Islander	3.7	13.3		
Caucasian-American	68.6	66.7		
Hispanic/Latino	9.8	0.0		
Multi-Ethnic	13.2	20.0		
Other	1.9	0.0		
Annual personal income			2.95	.400
Less than $10,000	84.9	90.0		
$10,000 - $30,000	13.9	6.7		
$30,000 - $50,000	1.1	3.3		
Over $50,000	0.2	0.0		
Annual household income			2.86	.414
Less than $20,000	27.4	36.7		
$20,000 - $60,000	37.4	23.3		
$60,000 - $100,000	21.1	23.3		
Over $100,000	14.2	16.7		
Years of education (M [SD])	12.5 (1.5)	13.0 (1.3)	-1.73	.084
Employment status			1.15	.562
Employed (>= 20 hours per week)	27.9	33.3		
Employed part-time (<20 hours per week)	25.8	30.0		
Unemployed/Homemaker	46.3	36.7		
Currently enrolled in school [a]			0.23	.709
Full-time/part-time	52.5	56.7		
Not enrolled	47.5	43.3		
Highest level of parental education			4.74	.315
Some high school or less	5.2	0.0		
Completed high school/GED	21.1	31.0		
Some college	16.4	6.9		
Completed college	35.7	37.9		
Some graduate work/A graduate degree	21.6	24.1		
Region			2.20	.532
Northeast	19.8	30.0		
Midwest	26.7	23.3		
South	25.8	23.3		
West	27.7	23.3		
Area type [a]			3.33	.107
Urban	84.9	96.7		
Rural	15.1	3.3		
Daily smoker	70.0	79.3	1.03	.403
Cigarettes per day (M [SD])	10.3 (8.2)	1.4 (.57)		
Smoke first cigarette within 30 minutes of waking	41.6	34.5	9.11	.028
Smoking stage of change			8.01	.018

Precontemplation	57.5	34.5
Contemplation	28.1	37.9
Preparation	14.4	27.6

Note. All values are percentages unless otherwise indicated.

[a]Fisher's exact test.

Table 2. Types of communication, valence, and sample quotes around using Facebook for smoking cessation

Facebook communications	Count/respondents	Valence (counts/respondents)	Sample Quote
General reactions to Facebook intervention	52/30	• Positive (33/23) • Negative (12/10) • Ambivalent (7/7)	Facebook is always better about everything. I am already there so I wouldn't have to go other places to see it. (Positive)
Facebook page that actively helps quitting	60/28	• Positive (46/24) • Negative (9/7) • Ambivalent (5/4)	yes, if the page posted quitting smoking facts or facts about how bad ciggerettes are. reading the posts on my community wall would be helpful. (Positive)
Facebook application that actively helps quitting	41/24	• Positive (26/18) • Negative (10/7) • Ambivalent (5/5)	Well my biggest thing every time I actually quit was trying to break my normal routine. So if you had something that would ask you to challenge that or modify your routine, that would work (Positive)
Personalized messages	23/21	• Positive (18/17) • Negative (4/4) • Ambivalent (1/1)	everyone is different so everyone goes through different withdrawl symptoms. While I may be irritable and gain a buncha weight, my friend could be coughing up a storm and having other symptoms. So personalized messages would def. be a good idea. (Positive)
Status updates about quitting	20/19	• Positive (14/14) • Negative (2/2) • Ambivalent (4/4)	there is plenty of interaction with those online…. Even just "liking" the status shows support. But friends also have the chance to show their opinion with comments. (Positive)
Wall posts	31/22	• Positive (16/12) • Negative (11/10) • Ambivalent (4/4)	…[wall posts] would provide an opportunity for your friends and loved ones to see how you're doing and maybe give you some words of encouragement. (Positive)
Using Facebook instead of other websites for quitting smoking	39/29	• Positive (20/17) • Negative (13/10) • Ambivalent (6/4)	I feel like if I was going to try and find a support group online for smoking, I would just use facebook… I feel like Facebok is really casual, and I don't want to mix casual circles with serious ones, usually. (Positive)

Note. Sample quotes were chosen to reflect the most common subthemes for each theme. All quotes are reproduced exactly as written by respondents.

Table 3. Themes and sample quotes around using Facebook for smoking cessation

Themes	Count/ respon-dents	Subthemes (counts/ respondents)	Sample Quote
Social support	75/25	• Positive (66/25) • Negative (7/6)	yes [I would be interested in a page

		• Ambivalent (2/2)	that brought people together who are dealing with similar issues with smoking], then there would be a group of people in the same situation and that can sometimes help things (Positive)
Privacy	48/20	• Concerned (32/18) • Not concerned (16/13)	are they degrees of privacy settings available?? not sure if i'd want everyone seeing that. some of my younger family doesnt kno i smoke and theyre parents are a little over protective. other ppl using the app might be ashamed as well (Concerned) hm, not really [concerned about privacy]. You are all trying to achieve the same goal so you aren't complete strangers (Not concerned)
Convenience of Facebook	28/17		if something was available on facebook and well designed, i would stick to just the facebook one, since i'm already on facebook, it's one less thing to check and keep track off
Inconvenience of other websites	10/9		Probably not [go to another website to get information about smoking], I would never get around to it.

Note. All quotes are reproduced exactly as written by respondents.

Figure 1a.

Figure 1b.