ORIGINAL INVESTIGATION

Unplanned Quitting in a Triethnic Sample of U.S. Smokers

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ABSTRACT

Introduction: Smokers who report quitting without prior planning have been shown to report longer abstinence compared with those who planned. Little is known about unplanned quitting (UQ) among U.S. smokers, minorities, or nondaily and light smokers.

Methods: Using an online panel, we recruited equal numbers of Black, White, and Latino nondaily, light daily, and moderate/heavy daily smokers. Of the 1,127 who reported a past-year quit attempt, we queried whether it was planned and the maximum number of days abstinent.

Results: Overall, 38% reported that their last quit attempt was unplanned. The impact of planned versus unplanned quitting interacted with smoking level and race. Among White moderate/heavy smokers, mean days abstinent was 99 for those who reported an unplanned quit attempt compared with 60 days for those who reported a planned attempt ($p = .02$). Among Black moderate/heavy smokers, the mean days abstinent was higher among those whose last attempt was planned, 92 days, compared with 56 days among those whose last attempt was unplanned ($p = .09$). The pattern among Latinos resembled Whites but was not significant. Results remained after adjusting for confounds such as age, gender, education, income, time to first cigarette, and menthol use. There were no significant differences in abstinence by quit type for light or nondaily smokers.

Conclusions: Future studies are needed to elucidate why UQ appears to have differential effectiveness across racial/ethnic groups and different levels of cigarette use. Research examining the impact of UQ on long-term quitting, which is not addressed here, is needed.

INTRODUCTION

Smokers who report that they quit without prior planning have been shown to report longer periods of abstinence and higher quit rates compared with those who reported that they planned their quit attempt (Ferguson, Shiffman, Gitchell, Sembower, & West, 2009; Larabie, 2005; Sendzik, McDonald, Brown, Hammond, & Ferrence, 2011; West & Sohal, 2006). Rates of unplanned quitting (UQ) across these four studies ranged from 26% to 51%, with UQ less common among current than ex-smokers (Ferguson et al., 2009; Sendzik et al., 2011). A similar phenomenon to UQ, labeled “quantum” or “sudden” change, has been reported to occur in psychotherapy and recovery from addiction (Bien, 2004; C’de Baca & Wilbourne, 2004; W. Miller, 2004; W. Miller & C’de Baca, 2001), and this type of transformational change has been associated with higher success rates among heavy drinkers (Matzger, Kaskutas, & Weisner, 2005) and patients receiving cognitive therapy for

depression and anxiety (Aderka, Nickerson, Boe, & Hofmann, 2012; Tang, Derubeis, Hollon, Amsterdam, & Shelton, 2007). The common element to this type of change across studies is that the decision seems to arise without conscious thought or planning. It is sudden and unexpected rather than planned or gradual.

The occurrence and apparent benefit of more spontaneous versus planned behavior change has major implications for behavior change theory and practice. For example, many models of behavior change recommend that individuals carefully plan their change, using strategies such as weighing pros and cons, preparing oneself emotionally and cognitively, and engaging the help of significant others (Bandura, 1986; Caplan, Stout, & Blumenthal, 2011; Fava, Velicer, & Prochaska, 1995; Godin & Kok, 1996; Hanson, 1997; Hatton, 2005; Houg, 2005; Okuyemi, Nollen, & Ahluwalia, 2006; J. O. Prochaska & Velicer, 1997; Rossi, Prochaska, & DiClemente, 1988). Although, as noted in a critique by J. Prochaska (2011), many

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“unplanned” quit attempts may still entail the use of such “planned” strategies, developing methods to encourage more spontaneous behavior change “epiphanies” may be warranted (Resnicow & Page, 2008). For example, counseling may focus less on encouraging a planned gradual progression toward change and establishing a quit date, but instead spending more time with the client finding compelling emotional and spiritual reasons to change that resemble the sudden change experience. Additionally, emphasis may be placed on the psychological work that occurs between counseling sessions rather than within.

The correlates of UQ are not well understood. One study reported race differences and found that UQ was more likely among U.K. non-Whites (Ferguson et al., 2009). However, little is known about UQ among U.S. minority groups. In one study, UQ was slightly less frequent among lower socioeconomic status (SES) smokers (West & Sohal, 2006) while in another study, UQ was more likely among those with less than a college education (Ferguson et al., 2009) and in another, education was unrelated to UQ (Sendzik et al., 2011). Thus, the association of SES and UQ has to date been mixed. Three of the four studies of UQ were conducted outside the United States (two in Canada and the other in the United Kingdom).

In terms of smoker characteristics, although unrelated to the number of cigarettes consumed per day (Ferguson et al., 2009; Sendzik et al., 2011), rates of UQ were greater among less dependent smokers, defined as smoking their first cigarette more than 30 min after waking (Ferguson et al., 2009), and those who self-reported as not being “very addicted” (Sendzik et al., 2011). The frequency and impact of UQ among nondaily and light smokers has not been studied. These smokers make up almost half of all U.S. smokers and approximately 66% of Black smokers, 76% of Latino smokers, and 40% of White smokers (Trinidad et al., 2009).

The current study examined the frequency and potential benefit of UQ in a multiethnic sample of U.S. smokers. The online sample was stratified to obtain equal samples of Black, White, and Latinos (the three largest racial and ethnic groups in the United States), as well as nondaily and daily smokers (further split evenly into light daily and moderate/heavy daily smokers). This study extends the evidence base of UQ in two important ways. First, this is the first study to include a sufficient number of minority smokers to enable ethnic/racial comparisons, and secondly, we intentionally sampled three types of smokers, daily heavy, nondaily, and light, to examine how the frequency and impact of UQ may vary by these groups. Unlike prior studies, we did not include ex-smokers as the focus of the parent project was understanding what differentiates nondaily, light daily, and heavier daily smokers.

METHODS

Participants

Participants completed a cross-sectional survey administered through an online panel survey service, Survey Sampling International (SSI), between July 5, 2012 and August 15, 2012. SSI maintains an online panel of 1.5 million people in the United States who have indicated that they are willing to participate in online surveys. Eligible participants self-identified as Black, White, or Latino (of any race) were English speaking

and were at least 25 years old (in order to exclude younger participants who would be more likely to be in the smoking uptake phase, particularly among Blacks who tend to initiate smoking later) (Trinidad, Gilpin, Lee, & Pierce, 2004). These participants had smoked on at least 4 days in the past month, had smoked at least 100 cigarettes in their lifetime, smoked for at least 1 year, smoked at their current rate (i.e., daily or nondaily) for at least 6 months, and had not participated in any smoking cessation treatment in the past 30 days. Women who were currently pregnant or breast feeding were excluded from the study because these women are likely to at least temporarily modify their smoking behavior (Floyd, Rimer, Giovino, Mullen, & Sullivan, 1993).

The sample was stratified to obtain equal samples of each of the three race/ethnicity groups across smoking frequency (nondaily and daily smoking). Nondaily smoking was defined as smoking at least one cigarette on 4–24 days in the past 30 days; persons who smoked on fewer than 4 days in the past 30 days were ineligible (Shiffman et al., 2012). Daily smoking was defined as smoking 25–30 days in the past 30 days. Light daily smoking was defined as ≤ 10 cigarettes per day (CPD) and moderate/heavy daily smoking as >10 CPD (Okuyemi et al., 2002). Recruitment quotas for the number of participants were 1,200 for nondaily smokers, 600 for light daily smokers, and 600 for moderate to heavy daily smokers.

Overall, 42,715 participants began the screener for this study, 21,891 were ineligible because of full quotas, and 4,581 discontinued at some point before completing the survey (90% prior to starting the survey). A total of 2,634 did not consent to the study and were not further screened. A total of 11,141 did not meet the study criteria; specifically, 4,438 were not current smokers, 633 did not meet the criteria for length of time smoking, 2,948 smoked three or fewer days in the past month, 2,109 has used smoking cessation assistance in the past 30 days, 692 did not meet the eligibility criteria for race and ethnicity, 186 were pregnant or breast feeding, 124 were younger than 25 years old, and 7 reported that they did not speak English. Sixty participants' completed surveys were removed from the data by the SSI during their quality check process as they were suspected duplicate responses. This resulted in 2,408 participants completing the survey—1,201 nondaily smokers and 1,207 daily smokers (i.e., 604 light daily smokers and 603 moderate to heavy daily smokers). We calculated a response rate of 25% from the number of potential participants ($n = 9,683$) who were not excluded from the study due to ineligibility. Thirty-two daily smokers (26 light smokers and 6 moderate to heavy smokers) responded inconsistently, that is, reporting “no” on an item that asked if they had smoked daily for 6 months or more, and were excluded from the data. This resulted in a study sample size of 2,376. The present analyses were limited to the 1,127 smokers who reported at least one quit attempt in the past year. Participant characteristics for the final sample of 1,127 are presented in Table 1.

Procedures

All procedures were approved by the University of Minnesota Institutional Review Board. SSI used preliminary questions (e.g., smoking frequency) and existing participant information (e.g., race/ethnicity, age) to direct smokers to this study. Potential participants directed to the study were presented with the informed consent page. Once they provided consent, they

Table 1. Sample Demographics by Smoking Level

Variable	Total <i>N</i> = 1,127	Nondaily smoker <i>N</i> = 684 (60.7%)	Light smoker <i>N</i> = 247 (21.9%)	Moderate to heavy smoker <i>N</i> = 196 (17.4%)
Race/ethnicity				
Black	387 (34.3%)	247 (63.8%)	73 (18.9%)	67 (17.3%)
Latino	395 (35.1%)	241 (61.0%)	86 (21.8%)	68 (17.2%)
White	345 (30.6%)	196 (56.8%)	88 (25.5%)	61 (17.7%)
Sex**				
Male	478 (42.4%)	321 (67.2%)	83 (17.4%)	74 (15.5%)
Female	649 (57.6%)	363 (55.9%)	164 (25.3%)	122 (18.8%)
Age: mean (<i>SD</i>)**	41.3 (12.2)	40.2 (11.91)	42.2 (12.4)	44.29 (12.6)
Days smoked/30 days: mean (<i>SD</i>)**	20.9 (8.2)	15.5 (5.70)	29.2 (1.7)	29.64 (1.1)
CPD on days smoked: mean (<i>SD</i>)**	8.5 (7.8)	5.6 (5.1)	7.0 (2.7)	20.39 (8.8)
Time to first cigarette**				
≤30 min	638 (56.6%)	321 (50.3%)	148 (23.2%)	169 (26.5%)
>30 min	489 (43.4%)	363 (74.2%)	99 (20.2%)	27 (5.5%)
Usually smoke menthol**				
Yes	694 (61.6%)	448 (64.6%)	146 (21.0%)	100 (14.4%)
No	433 (38.4%)	236 (54.5%)	101 (23.3%)	96 (22.2%)
Highest education level				
≤High school graduate	279 (24.8%)	165 (61.2%)	64 (21.6%)	50 (17.2%)
>High school graduate	848 (75.2%)	519 (59.1%)	183 (22.9%)	146 (17.9%)
Household income/month				
<\$1,800	394 (36.5%)	233 (59.1%)	101 (25.6%)	60 (15.2%)
>\$1,800	686 (63.5%)	415 (60.5%)	138 (20.1%)	133 (19.4%)

Note. CPD = cigarettes per day.

**Significant difference by smoking level, $p < .01$, based on analysis of variance for mean values and chi-square for others.

were asked screening questions to determine eligibility. If the quota for one of the nine subgroups (three race/ethnicity groups and three smoking levels) was filled, participants with those characteristics were no longer recruited. Eligible participants were then presented with the survey questions. Participants who completed the survey received SSI's standard incentives, entry into a quarterly drawing for \$12,500 available to the entire panel of 1.5 million, and points that could be redeemed for cash.

Measures

Demographics

Demographic questions assessed participants' age, gender, highest level of education, monthly household income (dichotomized to <\$1,800 and ≥\$1,800), as well as race and ethnicity. Race and ethnicity were assessed using two items used by the U.S. Department of Health and Human Services (Dorsey & Graham, 2011). The first item asked whether potential participants identified as Hispanic, and the second asked respondents to indicate their race (they could select more than one).

Cigarette Use

Participants reported the number of days they smoked in the past month, average number of cigarettes smoked per day (CPD) on the days smoked in the past 7 days, and whether they typically smoked mentholated or nonmentholated cigarettes. Menthol cigarettes use is associated with both race and ethnicity as well as cessation rates (Giovino et al., 2004; Okuyemi et al., 2003). Participants were asked to indicate the length of time they had been smoking cigarettes and whether they had ever smoked daily for at least 6 months. Current daily smokers were also asked the length of time as a daily smoker and current nondaily smokers were asked the length of time as a nondaily smoker.

Quit Attempts

All participants were asked, "How many TIMES during the past 12 months have you stopped smoking for 1 day or longer because you were trying to quit smoking?" Only those reporting at least one attempt were included in the present analyses. For those who had reported a past year quit attempt, we queried "the LONGEST length of time you stopped smoking because you were trying to quit smoking?" They were allowed to answer in days, weeks, or months. All responses were recoded into days for the present analyses. Those who reported having quit for more than 365 days ($n = 118$) were excluded from the present analyses, as we assumed they misunderstood the question, leaving 1,009 participants with valid number of days quit.

Planned and Unplanned Quitting

Participants who had reported a quit attempt in the past year were asked whether they planned their most recent quit attempt based on the method of West and Sohal (2006). Response options included, "I did not plan the quit attempt in advance, I just did it" and five other options indicating planning ranging from "I planned the quit attempt for later the same day" to "I planned the quit attempt a few months beforehand." Responses were dichotomized into planned versus unplanned most recent quit attempts, with only "I did not plan the quit attempt" indicating unplanned.

Use of Medication

Participants were asked in the past year if they ever used any of the following methods to help them quit smoking: nicotine patch, gum, or lozenge, other medications containing nicotine (inhaler, nasal spray), Zyban also known as Wellbutrin or Bupropion, and Chantix also known as Varenicline.

Unplanned quitting

Nicotine Dependence

Nicotine dependence was assessed using two single-item indicators. Time to first cigarette was dichotomized (smoking ≤ 30 min after waking and smoking > 30 min); smoking within 30 min of waking denotes nicotine dependence (Heatherton, Kozlowski, Frecker, & Fagerström, 1991). Using an item from the Cigarette Dependence Scale, participants were asked to report their level of perceived addiction to cigarettes on a scale of 0 (*I am not addicted to cigarettes at all*) to 100 (*I am extremely addicted to cigarettes*) (Ettter, Le Houezec, & Perneger, 2003).

Analysis

We first present the distribution of smoking level and planned/unplanned quitting by key demographic and smoking variables. We then tested for interactions of planned/unplanned quitting and days abstinent by race, for each type of smoker. Because the interaction term was significant for heavy smokers, we present results stratified by smoking type and race. Next, we provide the unadjusted mean number of days abstinent by smoking type and race, following by adjusted mean days, using the general linear model procedure in SPSS v. 20 (IBM, 2012). Further analyses adjusted for menthol versus nonmenthol use, use of cessation medication, and time to first cigarette.

RESULTS

The sample was 31% White, 34% Black, and 35% Latino (Table 1). Approximately 58% were female, and the majority had at least a high school education, and more than 65% had monthly income greater than \$1,800.

Overall, 38% of the sample reported that their last quit attempt was unplanned (Table 2). Rates of UQ were highest for nondaily smokers, 43%, followed by light daily smokers, 33%, and moderate/heavy daily smokers, 28%. Rates of UQ did not differ significantly by race, gender, age, or education. However, rates of UQ were significantly lower among those with $> \$1,800$ per month income (35%) compared with those with $< \$1,800$ monthly income (41%; $p < .05$).

Planned Versus Unplanned Quitting and Days Abstinent

Overall, the longest time abstinent in the past year averaged 77 days (range 1–333). Combining the three types of smokers, there was no significant difference in days abstinent by planned versus unplanned quitting, 75 and 80 days, respectively, $p = .29$

(data not shown). However, the impact of planned versus unplanned quitting interacted with level of smoking and race. The mean number of days abstinent was not statistically different for any racial group among nondaily and light smokers. However, among heavy smokers, there was a significant interaction with race, $p < .01$. Specifically, among White moderate/heavy smokers, the number of days abstinent was 99 for those who reported an unplanned quit attempt compared with 60 days for those who reported a planned attempt, $p = .02$. However, among Black moderate/heavy smokers, the pattern was reversed with the mean days abstinent higher among those whose last attempt was planned, 92 days, compared with 56 days for among those whose last attempt was unplanned, $p = .09$. The pattern among Latinos resembled Whites although the difference in days abstinent was not significant, $p = .07$ (data not shown). In multivariate analyses, adjusting for age, gender, and education, the interaction pattern among heavy smokers was again significant ($p < .01$). For White moderate/heavy smokers, the mean number of days was significantly greater among those who reported an unplanned quit attempt compared with those with a planned attempt. The pattern among Latinos continued to resemble Whites although the difference in days abstinent was again only borderline significant, $p = .06$. For Black moderate/heavy smokers, the pattern was again reversed with the mean days abstinent higher (although nonsignificant) for planned quitters (see Table 3). We initially excluded income from the multivariate model due to the number of missing values (36 participants indicated “Don’t know”) although including it in the model did not alter our main findings (data not shown). Similarly, inclusion of menthol use, medication, or time to first cigarettes as covariates did not impact our findings (data not shown).

DISCUSSION

The current study extends the evidence base of UQ in two important ways. First, this is the first study to include a sufficient number of minority smokers to enable ethnic/racial comparisons, and secondly, we purposively included three types of smokers, moderate/heavy daily, light daily, and nondaily. Two key findings emerged from our analyses. First, the benefits of UQ, previously reported in several studies of daily smokers (average CPD ranging from 11 to 19) (Ferguson et al., 2009; Larabie, 2005; Sendzik et al., 2011; West & Sohal, 2006), were not evident among nondaily and light daily smokers. Second,

Table 2. Distribution of Planned and Unplanned Quitting by Race/Ethnicity and Smoking Level

		Black		Latino		White		Total	
		<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Nondaily	Planned	142	57.5	150	62.2	100	51.0	392	57.3
	Unplanned	105	42.5	91	37.8	96	49.0	292	42.7
Light	Planned	51	69.9	57	66.3	57	64.8	165	66.8
	Unplanned	22	30.1	29	33.7	31	35.2	82	33.2
Moderate to heavy	Planned	47	70.2	49	72.1	45	73.8	141	71.9
	Unplanned	20	29.8	19	27.9	16	26.2	55	28.1
Total	Planned	240	62.0	256	64.8	202	58.6	698	61.9
	Unplanned	147	38.0	139	35.2	143	41.4	429	38.1

Note. None of the percentages differ significantly by race within smoking types.

Table 3. Adjusted^a Mean Days Abstinent by Planned vs. Unplanned Quitting by Race and Smoking Level

	Planned		Unplanned		<i>p</i> value
	Mean	<i>SE</i>	Mean	<i>SE</i>	
Nondaily					
White	54.9	6.6	62.5	6.8	.43
Black	88.3	7.1	85.4	8.3	.79
Hispanic	71.9	6.0	85.5	7.8	.14
Total					
Light					
White	79.8	8.7	81.4	11.8	.92
Black	77.9	10.8	82.2	16.4	.83
Hispanic	80.7	9.9	75.5	14.7	.78
Total					
Moderate to heavy*					
White	58.3	8.8	103.3	15.0	.01
Black	91.1	11.6	57.4	18.5	.13
Hispanic	78.9	11.5	124.8	20.1	.06
Total					
Overall	75.5	2.8	80.2	3.6	.30

Note. ^aAnalysis of variance adjusted for age, gender, and education.

*Interaction of race × planned/unplanned quitting among moderate to heavy smokers was significant $p < .01$.

among moderate/heavy smokers, there was a significant interaction with race. Among White heavy smokers, UQ was associated with significantly greater number of days abstinent, consistent with prior studies (Ferguson et al., 2009; Larabie, 2005; Sendzik et al., 2011; West & Sohal, 2006). However, somewhat surprisingly, among Black moderate/heavy smokers, UQ was associated with fewer days abstinent, although the difference was not significant. There were no racial/ethnic differences in the overall rate of planned versus unplanned quitting.

The overall rate of UQ observed here, 38%, is similar to the rate of UQ among current smokers in prior studies (Ferguson et al., 2009; West & Sohal, 2006). Rates of UQ are, however, higher among ex-smokers, a group not included here (Larabie, 2005). The method used to classify planned and unplanned quitting we used was identical to that used in prior studies (Ferguson et al., 2009; Sendzik et al., 2011; West & Sohal, 2006).

UQ may offer no advantage to nondaily and light smokers for a variety of reasons. UQ may represent a major sudden shift in motivation; a tipping point where smokers dramatically overcome their fears or resistance (Resnicow & Page, 2008; West & Sohal, 2006). Such epiphanies may not be necessary for lighter smokers, as they may be less resistant or fearful about quitting, in large part, due to feeling less addicted. In our study, for example, using a 0- to 100-point scale, moderate/heavy smokers rated their level of addiction 84 out of 100 compared with 67 among daily light and 46 among nondaily. Inclusion of time to first cigarette did not reduce the difference in days quit among White moderate/heavy smokers. Lighter smokers may not require such a cataclysmic shift in motivation in order to make a quit attempt. Interestingly, UQ was more common among nondaily and light smokers, despite the fact that it was apparently not more beneficial.

Some qualitative work has been published addressing unplanned behavior change; however, more work is needed to better understand the psychological processes that underlie planned versus unplanned behavior change (C'de Baca & Wilbourne, 2004; Larabie, 2005; W. Miller & C'de Baca,

2001). For example, it is unclear how much “planned” activity, such as contemplating quitting, exploring treatment options, or removing smoking cues, may precede an “unplanned” quit attempt. Further exploration of the “epiphany” experience is also warranted.

The race interaction observed among moderate/heavy smokers and planned versus unplanned quitting was not anticipated. Why UQ may be beneficial to White moderate/heavy smokers, whereas planned quitting may be more beneficial to Black moderate/heavy smokers merits elucidation. Use of menthol cigarettes, although more common among Blacks in prior studies (Giovino et al., 2004) (and here too, 84% among Blacks and 35% for Whites), cannot be invoked as the explanation for the interaction observed here, as even after inclusion of menthol use, the interaction between quit type and race remained significant. Similarly, inclusion of time to first cigarette and self-reported addiction did not eliminate the interaction. We also examined use of medication, which generally requires a planned attempt. However, Blacks were significantly less likely to report using either nicotine replacement, Bupropion, or Varenicline than Whites, and inclusion of medication use did not eliminate this race interaction among moderate/heavy smokers. Use of medication, however, was only asked in terms of their ever use, not in relation to the last quit attempt.

Prior studies have identified differences between Blacks and Whites in their decision-making style and counseling preferences (Levinson, Kao, Kuby, & Thisted, 2005; S. Miller, Khensani, & Beech, 2009; S. T. Miller & Beech, 2009). For example, Levinson et al. found in the General Social Survey that Black and Hispanic respondents were more likely to prefer that physicians make their health care decisions for them, whereas Whites preferred a more active role in medical decision making. This is consistent with qualitative studies of patient preferences for counseling style among Blacks (S. Miller et al., 2009; S. T. Miller & Beech, 2009). Although these studies do not directly address smoking cessation among Blacks and only indicate cultural differences in counseling interactions, these studies suggest that cultural differences may

exist in how behavior change decisions are made and perhaps interpreted, which in turn may contribute to the differential impact of UQ observed herein.

Further, there may be unmeasured ethnic/racial differences in how participants responded to key study questions such as the planned versus unplanned nature of their quit attempt or the number of days abstinent that may have biased our results. These include extreme response style and acquiescent response style (Davis, Resnicow, & Couper, 2011). In addition to response styles, there may be ethnic/racial differences in recall or reporting of tobacco use milestones that could result in misclassification of both quit type or days abstinent, which would limit the validity of our findings (Brigham et al., 2010). Prior studies of UQ used 6 months of abstinence as the criterion for success. In our study, we used mean number of days. We could not use 6-month abstinence as an outcome, as only 7% of the sample reported a quit attempt lasting 180 days or longer.

Our study did not include ex-smokers. This could impact the generalizability and validity of our findings in several ways, depending on the relationship of UQ among ex-smokers. If ex-smokers are less likely to have used the unplanned pathway than short-term quitters, that is, relapsers who initially quit via the unplanned pathway, then the validity and importance of our findings would be attenuated. Conversely, if the association of UQ was stronger among long-term quitters, then our findings could be considered an underestimate of the true impact. Although we cannot discern the direction of the potential bias, we introduced by not including ex-smokers, in a prior study that did include ex-smokers, current smokers (29.5%) were less likely than ex-smokers (52.4%) to report that their most recent quit attempt had been unplanned (Ferguson et al., 2009). This suggests that UQ may be more likely to impact long-term cessation and therefore our findings may generalize to long-term quitting. Moreover, in two studies, the impact of UQ was examined with and without ex-smokers in the analyses, and the results were essentially similar even when ex-smokers were removed from the analyses. This suggests that the impact of UQ may be equally beneficial to both current and ex-smokers (Ferguson et al., 2009; West & Sohal, 2006). Finally, even if UQ was only helpful for short term abstinence, the positive experience of having quit for at least 6 months might help some smokers quit long term, even if the final decision is not made via the unplanned pathway.

Another limitation is that the number of analyses performed could have resulted in Type I error, which could lead to the false conclusion that UQ is associated with longer term abstinence when in fact it is not. Moreover, raising the *p* value threshold by common methods such as Bonferroni would have eliminated the significant differences in days abstinent that were evident for White moderate/heavy smokers. Thus, our findings must be interpreted in the context of possible Type I error, although given that most of our associations were null, the impact of Type I error is limited.

Participants in this sample belonged to an online survey panel and are not necessarily representative of the larger U.S. population. And, the survey was self-administered in English and therefore our Latino sample is limited to more acculturated Latinos. Despite these limitations, the online panel is comprised of a large number of individuals across the country, thus enabling generalizability beyond specific geographic regions. In addition, the online panel was socioeconomically diverse, further enhancing the generalizability of our findings.

Future studies are needed to replicate and elucidate the racial differences we observed here and better understand why UQ appears to have differential effectiveness across racial/ethnic groups and different levels of cigarette use. Further, additional research is needed to identify *how* UQ benefits some smokers and, if our findings are replicated, planned quitting benefits Black heavier smokers. Such analyses have the potential to help clinicians' target interventions to specific smoker characteristics and increase the likelihood of successful quitting. Research examining the impact of UQ on long-term quitting, something not addressed here, is also needed.

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DECLARATION OF INTERESTS

None declared.

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