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Risk Perception and Intention to Quit Among a Tri-Ethnic Sample of Nondaily, Light Daily, and Moderate/Heavy Daily Smokers

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Abstract

Introduction—Although the relationship between risk perceptions and quit intentions has been established, few studies explore the potential impact of smoking level on these associations, and none have done so among diversely-aged samples of multiple ethnicities.

Methods—Participants, ranging in age from 25 to 81, were 1133 nondaily smokers (smoked 1 cigarette on 4 to 24 days in the past 30 days), 556 light daily smokers (10 cigarettes per day), and 585 moderate to heavy daily smokers (>10 cigarettes per day). Each smoking level comprised approximately equal numbers of African Americans, Latinos, and Whites. A logistic regression

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Contributors

The authors' contributions to the current manuscript are as follows: Ms. Savoy, Dr. Reitzel, Mr. Agarwal, Dr. Scheuermann, and Dr. Ahluwalia conceptualized the research question. Dr. Reitzel and Mr. Agarwal drafted the analysis plan and ran analyses. Dr. Mathur and Dr. Choi provided input on analysis interpretation, and Ms. Savoy and Dr. Reitzel wrote the manuscript, with input from all co-authors. Dr. Ahluwalia and Dr. Scheuermann led the parent study from which the data came and prepared the database for analysis. All co-authors reviewed and edited manuscript drafts. Work for this manuscript was initiated when Ms. Savoy, Dr. Reitzel, and Mr. Agarwal were working with MD Anderson Cancer Center, but the bulk of the work on it was completed at the current/listed institutional affiliation (the University of Houston).

Conflict of Interests

Authors have no competing interests pertaining to this research.

analysis, adjusted for sociodemographics, self-rated health, time to the first cigarette of the day and smoking level, was used to examine the association between risk perception (perceived risk of acquiring lung cancer, lung disease, and heart disease) and intention to quit (6 months versus >6 months/never). A second adjusted model tested moderation by smoking level with an interaction term.

Results—Greater risk perception was associated with a higher odds of planning to quit within 6 months (AOR=1.34, CI₉₅=1.24, 1.45). Smoking level did not moderate this association ($p=.85$).

Conclusions—Results suggest that educating all smokers, irrespective of their smoking level, about increased risk of developing smoking-related diseases might be a helpful strategy to enhance their intention to make a smoking quit attempt.

Keywords

risk perception; intention to quit; nondaily smoking; light daily smoking; smoking level

1. Introduction

It is estimated that 19% of all adults in the United States currently smoke, and this behavior has been linked to serious health problems such as cancer, lung diseases, heart disease, as well as earlier mortality (CDC, 2012). Despite the notoriety of these health consequences, many adults continue to smoke and struggle with committing to quit (Hyland et al., 2013). Previous research indicates that smokers who perceive themselves at higher risk of developing a health condition as a result of smoking were more likely to intend to quit smoking in the forthcoming months (Park et al., 2009; Hahn & Renner, 1998). This is important because the intention to quit smoking is associated with actually making a quit attempt and with achieving smoking abstinence (Smit, Fidler, & West, 2011). Consequently, educating smokers about the health risks of smoking, personalizing these risks to the smokers' experience, and using this process to build motivation to make a quit attempt are common elements in smoking cessation interventions (Fiore et al., 2008). However, the majority of studies linking smoking-related risk perceptions with intentions to quit include predominantly White samples and do not distinguish between smokers of various levels (i.e., nondaily, light daily, and moderate to heavy daily) (Hahn & Renner, 1998; Weinstein, 2001; Weinstein, Marcus, & Moser, 2005). A recent study of current smokers found that around 24% of African Americans and 36% of Hispanic Americans were nondaily smokers, and around 12% and 19%, respectively, were light daily smokers (Trinidad et al., 2009). These figures further support the need for ethnically-balanced samples in tobacco research given the large percentages of these groups comprising these categories. Furthermore, it is not clear from the current literature whether risk perceptions relate to quitting intentions among diverse adults of all smoking levels. Understanding more about these relations may help to guide cessation interventions among less studied groups, such as nondaily and light daily smokers.

Nondaily smokers are those who smoked within the past month but less than every day (Sutfin et al., 2012). Estimates indicate that nondaily smokers represent between 16% and 22% of current adult smokers (Wortley, Husten, Trosclair, Chrismon, & Pederson, 2003;

CDC, 2012), and many nondaily smokers have exhibited this stable smoking pattern for more than five years (Tong, Ong, Vittinghoff, & Perez-Stable, 2006). Importantly, research has indicated that nondaily smokers are distinct from moderate and heavy smokers in terms of their demographic characteristics as well as the ways they approach quitting (Sutfin et al., 2012; Tong et al., 2006; Tindle & Shiffman, 2011). Tong and colleagues (2006) found that nondaily smokers were more likely than daily smokers to want to quit within the next 6 months, suggesting that smokers at this level might be more amenable to treatment interventions than those who smoke more frequently. Nondaily smokers also tend to be younger, are more likely to be members of racial/ethnic minority groups, exhibit lower nicotine dependence than daily smokers, and are less likely to be targeted for treatment by healthcare providers (Cooper et al., 2010, Sutfin et al., 2012, Tong et al, 2006). Cooper and colleagues (2010) also found that nondaily smokers endorsed a lower perceived likelihood of developing a smoking related illness as compared to light smokers. Other studies have also found that nondaily tobacco users often minimize the health effects of their smoking (Ames et al, 2009). Some of this may be attributable to a lack of knowledge about the true health risks of nondaily smoking or an erroneous belief that reducing the consumption of nicotine successfully mitigates or eradicates the health risks associated with smoking (Tong et al, 2006). In fact, when compared with nonsmokers, nondaily smoking has been associated with a variety of health consequences, including an increased risk for myocardial infarction (Prescott, Scharling, Osler, & Schnohr, 2002), cancer (Bjartveit & Tverdal, 2005), and cardiovascular mortality (Prescott et al., 2002). In addition, nondaily smokers do not usually identify themselves as smokers or in need of medical advice about quitting, contributing to the reduced likelihood of being identified as a smoker and counseled to quit by treatment professionals (Sutfin et al, 2012). Together, these studies suggest that risk perceptions and quitting intentions may not be strongly associated among nondaily smokers, relative to what has been demonstrated in previous research among smokers of other levels.

Similar to nondaily smokers, light daily smokers are also understudied relative to moderate to heavy daily smokers. Among daily smokers, the prevalence of light daily smoking (1–9 cigarettes per day) is estimated to be 22% (CDC, 2012). These smokers tend to be young, well educated, and come from minority populations (Schane, Ling, & Glantz, 2009). Light daily smokers have also been found to have higher rates of planning to quit as well as number of quit attempts than moderate to heavy daily smokers (Boulos et al., 2009; Owen, Kent, Wakefield, & Roberts, 1995). Past studies have also found that light daily smokers have a lower perception of health risks in comparison to moderate to heavy daily smokers (Levy et al., 2009). Given the low rate at which light daily smokers use tobacco products, many will not identify themselves as a smoker when questioned by a health professional (Schane, Ling, & Glantz, 2009). As a result, this tendency to align themselves with nonsmokers strengthens the misconception that light daily smoking does not carry negative health consequences when in fact light and nondaily tobacco use has been linked to a variety of serious health risks (Schane, Ling, & Glantz, 2010). However, light daily smokers are commonly excluded from clinical trials of cessation interventions, so less is known about how to intervene among these smokers relative to moderate/heavy daily smokers (Schane, Ling, & Glantz, 2010). With so few studies devoted to light daily smokers, it is important to learn more about the specific characteristics that may distinguish them from the moderate/

heavy daily smokers to inform intervention strategies. To our knowledge, no extant studies have examined the strength of the associations between risk perceptions and intentions to quit among light daily smokers relative to both nondaily and moderate/heavy daily smokers.

The purpose of the current study was to examine the association of smoking risk perception and intention to quit smoking among a tri-ethnic sample of nondaily, light daily, and moderate/heavy daily smokers, in analyses adjusted for sociodemographics, self-rated health, time to first cigarette after waking, and smoking level. This study sought to improve upon the extant literature by using a diverse sample, including a range of smoking levels, and by explicitly examining whether the association between risk perception and intention to quit was moderated by smoking level. Understanding more about how risk perceptions and intentions to quit might differ by smoking level can aid in the tailoring of cessation interventions for less studied groups such as nondaily and light daily smokers.

2. Methods

2.1 Participants and Procedures

Data were collected as part of an internet-based survey study designed to better understand factors associated with smoking levels. Participants were recruited via Survey Sampling International (SSI), an online panel survey company. Recruitment was accomplished via daily e-mail invitations sent to SSI panelists (individuals who have indicated their willingness to complete online surveys) and targeted email invitations to panelists known by SSI to meet some of the study criteria. Participants were required to be ≥25 years of age, self-identified African American, White, or Latino (of any race), self-identified current daily or non-daily smokers who smoked at least 100 cigarettes in their lifetime, had been smoking for at least 1 year, smoked at their current rate (i.e., daily or nondaily) for at least 6 months, smoked on at least 4 days out of the past 30 days, and had not participated in any smoking cessation treatment in the past 30 days. A stratified sampling procedure was employed to obtain equal numbers of daily smokers and nondaily smokers for each racial/ethnic group, resulting in a sample of 2376 eligible daily and nondaily smokers. The University of Minnesota Institutional Review Board approved this study. Additional details on the study procedures have been published previously (Kendzor et al., 2013; Reitzel et al., 2014).

2.2 Measures

2.2.1 Sociodemographics—Sociodemographics included age, sex, race/ethnicity (African American, Latino, or non-Latino White), educational level (≤high school degree/GED versus >high school degree/GED), and monthly household income before taxes (<\$1800 versus ≥\$1800). Participants indicated which of several categories captured their monthly household income; the income dichotomy used in this study was based on the distribution of endorsements and was designed to differentiate relatively low-income earners from those of higher income (i.e., for ease of interpretability).

2.2.2 Self-rated health—Participants were asked to rate their health (“in general”) on a scale ranging from 1=poor to 5=excellent. A binary self-rated health variable was used in analyses (poor/fair health versus good/very good/excellent health).

2.2.3 Smoking-related variables—Smoking-related variables were time to the first cigarette of the day after awakening (< 30 minutes versus > 30 minutes) and smoking level. Smokers in this study were recruited into groups based on their self-reported smoking level. Nondaily smokers (NDS) smoked at least 1 cigarette on 4 to 24 days in the past 30 days (Evans et al, 1992; Shiffman et al., 2012). Daily smokers smoked 25 to 30 days in the past 30 days and were further subdivided for recruitment into light daily smoking [LDS; < 10 cigarettes per day (CPD)] and moderate to heavy smoking (M/HDS; > 10 CPD) groups.

2.2.4 Risk perceptions—Risk perceptions (Borrelli, Hayes, Dunsiger, & Fava, 2010) included three discrete items. The first future perceived risk item was “If you continue to smoke, how likely do you think it is that you will develop lung cancer?” Answer options ranged from: 1=no chance, 2=very unlikely, 3=unlikely, 4=moderate chance, 5=likely, 6=very likely, 7=certain to happen. The other two items were phrased similarly and included the same answer options but asked about likelihood of developing “other lung diseases, like emphysema” and “heart disease,” respectively. This scale has demonstrated good construct and predictive validity. Future perceived risks were strongly correlated with current perceived risk of developing smoking-related conditions (.42, $p < 0.01$), and increases in future perceived risks were prospectively associated with smoking abstinence six months later (OR = 3.16, 95% CI: 1.16–8.57, $p < 0.05$; Borrelli, et al., 2010). The correlations between these variables were high, ranging from .84 to .88 (p values < .01), and Cronbach’s Alpha was .95. Consequently, we averaged responses on these items to create a single risk perception variable for analyses, with higher values indicating greater perception of health risks.

2.2.5 Intention to quit—Intention to quit (Fava, Velicer, & Prochaska, 2010) was assessed with the following item: “What best describes your intent to stop smoking completely, not even a puff?” Answer options were: 1=never expect to quit, 2=may quit in the future, but not in the next 6 months, 3= will quit in the next 6 months, and 4=will quit in the next 30 days. A binary intention to quit variable was used in analyses (never quit/not in the next 6 months versus will quit within the next six months).

2.3 Data Analyses

Participant characteristics were examined for the sample as a whole and by smoking level using descriptive statistics. Preliminary analyses assessed differences in participant characteristics between smoking level groups using Analyses of Variance (ANOVAs) and chi-square tests.

Main analyses consisted of a logistic regression examining the association between risk perception and intention to quit, adjusted for age, sex, race/ethnicity, educational level, income, self-rated health, time to the first cigarette of the day, and smoking level. The potential for moderation of these associations by smoking level was examined by including an interaction term in a second fully adjusted logistic regression (smoking level * risk perception).

All analyses were conducted using SPSS, version 19 (IBM, NY) and statistical significance was set at $p < 0.05$.

3. Results

3.1 Participant Characteristics

Of the original sample, 2,274 participants had complete information on all variables of interest in the current study and were included in analyses ($n=102$ had missing income data and were excluded). Participants were 43 years of age on average (± 12.4), and the sample was comprised of 57.7% women. Responses for the individual risk perception items as well as the combined risk perception variable ranged from 1 to 7. The median for each individual risk perception item was 4, and the median for the combined risk perception variable was 4.33. Participant characteristics are detailed in Table 1.

3.2 Preliminary Analyses

Smoking level groups significantly differed from one another on several variables, including age, sex, education, income, self-rated health, time to the first cigarette of the day, risk perception, and intention to quit, as detailed in Table 1. Results indicated that NDS endorsed significantly lower risk perceptions than LDS ($p < 0.001$) and M/HDS ($p < 0.001$); however, the LDS did not significantly differ from the M/HDS ($p = 0.199$).

3.3 Main Analyses

Results indicated that risk perception was associated with intention to quit (Adjusted Odds Ratio = 1.34, $CI_{95} = 1.24, 1.45$), such that a one unit increase in risk perception was associated with 34% increase in odds of planning to quit within the next 6 months (see Table 2 for the full model). The association between risk perception and intention to quit was not moderated by smoking level ($p = .85$).

4. Discussion

Results indicated that smoking-related risk perception was positively associated with the intention to make a forthcoming quit attempt, as has been found in several previous studies (Cooper et al., 2010; Park et al., 2009; Borrelli, Hayes, Dunsiger, & Fava, 2010). The current study extended these results to an ethnically diverse sample of non-treatment seeking adult smokers of varying smoking levels. These results indicated that risk perceptions significantly differed by smoking level, with the lowest health risk reported by NDS, followed by LDS, and M/HDS. This is also similar to previous studies, although many of these focused on comparisons between only nondaily and daily smokers (Borrelli, Hayes, Dunsiger, & Fava, 2010; Sutfin et al., 2012) or nonsmokers, ex-smokers, and current smokers (Hahn & Renner, 1998). However, it is worth noting that in the current sample, mean differences in risk perception between smoking levels were relatively small, with all groups averaging in the “moderate risk” category. With regard to quitting intentions, the current results indicated the highest proportion of participants willing to quit smoking within the next 6 months were found among the NDS group (39%), followed by the LDS group (32%), and the M/HDS group (27%). This is also consistent with prior studies reporting a stronger desire to quit smoking within the next 6 months among nondaily relative to daily smokers (Tong et al., 2006; Hyland et al., 2013).

A unique contribution of the current study is the examination of moderation effects of smoking level on the relationship between risk perceptions and intention to quit. From an interventions perspective, the findings that higher levels of perceived risk was associated with greater intention to quit across smoking levels suggest that clinicians and medical professionals should educate smokers about their health risks from smoking, regardless of their smoking level. Research comparing current smokers to former smokers has shown that greater understanding about the risks of smoking and greater personalization of these hazards is associated with increased likelihood of successful quitting (Park et al., 2009; Hahn & Renner, 1998). The current results extend this finding and suggest that enhancing and personalizing smokers' risk perceptions so that the individual internalizes the consequences of his/her health choices may be an important component of cessation interventions for all smokers. Cessation interventionists should couple the enhancement of risk perceptions with information about the benefits of quitting, effective tools and techniques for smoking cessation, and support for such efforts (Leventhal, Glynn, & Fleming, 1987). Although treatment tailoring may be necessary for low-level smokers with regard to pharmacotherapies due to the lower nicotine dependence found among these smokers (Hyland et al., 2013; Tong et al., 2006; Tindle & Shiffman, 2011), the current results do not seem to support that education regarding the risks of smoking should be reserved for only moderate to heavy daily smokers.

Unfortunately, NDS and LDS are less likely to be asked about their tobacco use and are less frequently advised to quit smoking by their physicians relative to daily smokers (Tong et al., 2006). Given that a significant proportion of NDS and LDS in this study reported an intention to quit within the next 6 months, treatment professionals may be missing an important opportunity to capitalize on these intentions. This is especially concerning as research suggests that NDS are particularly receptive to physicians' advice and put more trust in them as suppliers of health information as compared to M/HDS (Rutten, Augustson, Doran, Moser, & Hesse, 2009). The lower likelihood of receiving this counseling, combined with the tendency for NDS and LDS to minimize the health consequences of their smoking, might inadvertently reinforce the misconception that lower-level smokers are at minimal risk of developing tobacco-related diseases.

The present study benefitted from a large sample of African American, Latino, and White nondaily, light daily, and moderate to heavy daily smokers from around the nation. Due to the fact that NDS and LDS are more likely to be minorities whereas heavy smokers are more likely to be Caucasian (Hassmiller et al., 2003; Wortley, Husten, Trosclair, Chrismon, & Pederson, 2003; Gilpin et al., 2003; Husten, McCarty, Giovino, Chrismon, & Zhu, 1998), this ethnic diversity was important. At least one previous study has found that risk perceptions are lower among minority populations than Whites ("the optimistic bias") (Borrelli et al., 2010). Although the current study treated race/ethnicity as a covariate, post-hoc analyses indicated that race/ethnicity was not a moderator of the association between risk perceptions and intentions to quit in the current sample. Additionally, it is worth mentioning that African Americans had higher odds of intentions of quitting compared to Whites in adjusted analyses. This finding merits further consideration and future research given studies which have found that African Americans are less successful in their quit attempts (Royce, Hymowitz, Corbett, & Hartwell, 1993; Pederson, Ahluwalia, Harris, &

McGrady, 2000). It is also worthy of note that the sample comprised non-treatment seeking smokers, who were less likely than treatment-seeking smokers to have artificially elevated perceptions of risk as a result of their readiness to quit (Gibbons, McGovern, & Lando, 1991).

Strengths of this study are balanced by limitations, which include the use of cross-sectional data, precluding assumptions of causality. Furthermore, the participants were recruited from an online survey panel and may not have been representative of the larger population of smokers in the U.S. Since survey procedures were only provided in English, results may lack generalizability to non-English speakers (e.g., less acculturated Latino smokers). Possible other limitations included the reliance on participants' self-reported smoking behaviors, which may be subject to recall or other biases. Also, this study was conducted among three racial/ethnic groups, and results may not generalize to other racial/ethnic minorities in the U.S. Finally, future studies would benefit from a focus on quit attempts or cessation rather than behavioral intentions in order to advance research in this area.

In summary, the current study was the first to our knowledge to explore the potential impact of smoking level on associations between risk perceptions and intentions to quit smoking within a sample that included participants of diverse ages and ethnicities. Results revealed greater risk perception was associated with increased odds of an intention to make a forthcoming quit attempt, and that this association did not vary by smoking level. Consequently, educating all smokers, irrespective of their smoking level, about increased risk of developing smoking-related diseases might be a helpful strategy to enhance their intention to make a forthcoming smoking quit attempt. This highlights the importance of treatment professionals assessing smoking status among all patients in such a way that nondaily and light daily smokers will identify themselves as smokers. In addition, given that the moderate to heavy daily smokers in this sample rated themselves similarly (moderate risk) as nondaily smokers with regards to perceived risk suggests that further education about the health risks associated with smoking would be beneficial for this group.

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Highlights

- Risk perceptions and intentions to quit were examined among a tri-ethnic sample.
- Risk perceptions were positively associated with the intention to quit.
- Smoking level did not moderate the risk perception and quit intention association.
- Educating smokers of all levels about associated health risks might enhance quit intentions.

Table 1

Participant Characteristics and Differences by Smoking Level.

Participant Characteristics	By Smoking Level			Whole Sample (Total=2274)
	Nondaily (n=1133)	Light daily (n=556)	Moderate/heavy daily (n=585)	
	Mean (SD) / % [n]	Mean (SD) / % [n]	Mean (SD) / % [n]	Mean (SD) / % [n]
Sociodemographics				
Age	41.4 (12.31)	43.6 (12.60)	45.44 (12.02)	42.98 (12.42)
Sex:				0.006
Male	44.7 [506]	36.5 [203]	43.1 [252]	42.3 [961]
Female	55.3 [627]	63.5 [353]	56.9 [333]	57.7 [1313]
Education:				0.022
High school degree/GED	23.7 [268]	29.7 [165]	27.4 [160]	26.1 [593]
>High school degree/GED	76.3 [865]	70.3 [391]	72.6 [425]	73.9 [1681]
Income:				0.023
<\$1800/month	37.0 [419]	41.0 [228]	33.2 [194]	37.0 [841]
\$1800/month	63.0 [714]	59.0 [328]	66.8 [391]	63.0 [1433]
Race/Ethnicity:				0.991
White	33.2 [376]	34.0 [189]	34.2 [200]	33.6 [765]
African American	33.7 [382]	33.3 [185]	33.7 [197]	33.6 [764]
Latino	33.1 [375]	32.7 [182]	32.1 [188]	32.8 [745]
Self-Rated Health				<0.001
Poor/fair health	22.6 [256]	23.7 [132]	31.5 [184]	25.2 [572]
Good/very good/excellent health	77.4 [877]	76.3 [424]	68.5 [401]	74.8 [1702]
Smoking-related Variables				<0.001
First Cigarette: >30 minutes	60.9 [690]	36.2 [201]	12.6 [74]	42.4 [965]
First Cigarette: 30 minutes	39.1 [443]	63.8 [355]	87.4 [511]	57.6 [1309]
Risk Perception Items				
Individual Item: Lung Cancer	4.34 (1.34)	4.60 (1.24)	4.69 (1.33)	4.49 (1.32)
Individual Item: Lung Diseases	4.42 (1.37)	4.70 (1.30)	4.82 (1.38)	4.58 (1.37)

Participant Characteristics	By Smoking Level			Whole Sample (Total=2274) Mean (SD) / % [n]
	Nondaily (n=1133)	Light daily (n=556)	Moderate/heavy daily (n=585)	
	Mean (SD) / % [n]	Mean (SD) / % [n]	Mean (SD) / % [n]	
Individual Item: Heart Disease	4.43 (1.38)	4.66 (1.27)	4.75 (1.34)	4.57 (1.35)
Risk Perceptions Combined	4.39 (1.30)	4.65 (1.21)	4.75 (1.29)	4.55 (1.28)
Intention To Quit				
Quit within next 6 months	39.1 [443]	31.5 [175]	27.4 [160]	34.2 [778]
Never Quit /may not in 6 months	60.9 [690]	68.5 [381]	72.6 [425]	65.8 [1496]

Note: Differences between smoking level groups on participant characteristics were assessed using chi-square tests and Analyses of Variance. Higher values on risk perceptions combined = greater perception of health risks.

Table 2

Adjusted Association between Risk Perceptions and Intention to Quit.

Variables in the Model	B	S.E.	χ^2	Odds Ratio	P value
Sociodemographics					
Age	0.007	0.004	3.014	1.01	0.083
Sex:					
Male (REF)					
Female	0.309	0.095	10.672	1.36	0.001
Education:					
High school/GED (REF)					
>High school/GED	0.291	0.111	6.899	1.34	0.009
Income:					
<\$1800/month (REF)					
\$1800/month	-0.022	0.099	0.051	0.98	0.821
Race/Ethnicity:					
White (REF)					
African American	0.341	0.111	9.454	1.41	0.002
Latino	-0.197	0.118	2.794	0.82	0.095
Self-Rated Health					
Poor/fair (REF)					
Good/very good/excellent	-0.027	0.107	0.065	0.97	0.798
Smoking-related Variables					
Time until 1st cigarette of day:					
>30 minutes (REF)					
30 minutes	-0.312	0.103	9.228	0.73	0.002
Smoking Level:					
Moderate/Heavy Daily (REF)					
Light Daily	0.172	0.136	1.592	1.19	0.207
Non-daily	0.539	0.125	18.458	1.71	<0.001

Variables in the Model	B	S.E.	χ^2	Odds Ratio	P value
Risk Perceptions Combined	0.292	0.039	57.24	1.34	<0.001

Note: The adjusted association between risk perceptions and intention to quit was assessed using logistic regression. S.E. = Standard Error. REF = Reference group. The reference group for the Intention to Quit outcome variable was "never quit/may not in next 6 months." Higher values on risk perceptions combined = greater perception of health risks.