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Current Smoking as a Predictor of Chronic Musculoskeletal Pain in Young Adult Twins

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Abstract

Chronic pain is common during adolescence and young adulthood and is associated with poor quality of life, depression, and functional disability. Recognizing that chronic pain has significant consequences it is important to identify modifiable health behaviors that may place young adults at-risk for chronic pain. This study examines associations among chronic musculoskeletal pain and smoking in young adult twins (n=1588, ages 18–30) participating in a statewide twin registry. Twins completed questionnaires assessing smoking, mood (anxiety, depressive symptoms, stress), and chronic musculoskeletal pain. Analyses examined associations among chronic pain and smoking, particularly the role of genetics/shared familial factors and psychological symptoms. As predicted, results revealed a near two-fold increased risk for chronic musculoskeletal pain in twins who currently smoked compared to non-smokers, even when accounting for psychological factors. Results of within-pair analyses were only minimally attenuated suggesting associations among smoking and chronic musculoskeletal pain are better accounted for by non-shared factors than shared familial factors/genetic effects. Future twin research is needed to identify what non-shared factors (e.g., attitudes, direct effects of smoking on pain) contribute to these associations to further understand comorbidity. Longitudinal studies and recruitment of participants prior to smoking initiation and chronic pain onset will better identify causal associations.

Keywords

chronic pain; smoking; twins; young adult

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Chronic pain is common during adolescence and young adulthood^{6,14} and is associated with poor quality of life, depression, and functional disability.^{26,27,54,60} Musculoskeletal pain is of particular concern and is the chief complaint at approximately 30% of primary care visits in individuals 20–39 years.³³ Recognizing that chronic pain has significant socioeconomic consequences (e.g., lost work productivity)⁵¹ and costs to the health care system,³⁴ it is important to identify modifiable health behaviors that may place young adults at-risk for chronic pain.

Smoking prevalence and initiation is highest during young adulthood^{4,19} making it a behavior of interest when examining risk for chronic pain. Research has shown smoking is associated with concurrent pain intensity and pain-related disability across the lifespan such that individuals with chronic pain who smoke have higher pain and greater pain-related functional impairment than nonsmokers.^{26,36,38,54,57,60} Associations among smoking and pain are particularly strong in younger populations, with the strongest associations among smoking and back pain occurring during adolescence.⁴⁹ Compared to nonsmokers, young adults who smoke are at increased odds for temporomandibular disorders⁴⁵ and recurrent headaches.⁵⁵ Moreover, smoking is associated with multiple pains³⁷ and is a risk factor for the development and persistence of pain over time.^{16,35}

Several explanations have been put forth concerning associations between smoking and chronic pain across the lifespan. Smoking can lead to physiological changes (e.g., down regulation of the hypothalamic pituitary axis) which may: increase pain sensitivity and pain perception, accelerate bone degeneration, and lengthen healing time (see review⁴⁸). Psychological factors have also been implicated, such that individuals with chronic pain may initiate or continue smoking to cope with pain and distress.^{11,12,39}

Research has examined psychological factors associated with both pain and smoking, particularly anxiety and depression. Individuals with comorbid chronic pain and depression have a higher incidence of smoking compared to those without comorbidity (see review⁴⁹), and adults with chronic pain who smoke have higher levels of depression²⁴ and greater suicidal ideation¹⁸ than nonsmokers. Moreover, in one study of young adults, adjusting for anxiety and depression attenuated associations among chronic pain and smoking²³ suggesting that psychological factors contribute to this relationship.

The role of genetics in associations between smoking and pain has also been explored, with individual genes implicated in both smoking initiation^{32,46} and chronic pain development.^{7,13} Studies employing twin-control designs have been conducted to clarify the role of familial factors/shared genetics in associations among smoking and chronic pain. Two studies, both utilizing back pain samples, examined these associations among adolescents and young adults.^{22,31} Results supported prior non-twin research, showing higher incidence of back pain in individuals that smoked. Twin-control analyses did not reveal a strong contribution of shared familial factors/genetics to associations suggesting non-shared factors may play a greater role.

The current study extends previous young adult twin research by examining associations between smoking and chronic pain using a broader musculoskeletal pain sample and taking into account psychological factors. While previous research has accounted for psychological factors in associations among pain and smoking (e.g.,^{23,62,63}), none were twin-study designs. Specifically we sought to: 1) identify whether familial factors (common environment and shared genetics) significantly contribute to associations between smoking and chronic musculoskeletal pain in young adult twins, and 2) examine associations among pain and smoking while accounting for the contributions of stress, anxiety, and depression. A diverse pain sample was chosen because while back pain is common, pain at other sites

(e.g., neck, knee) accounts for up to 70% of musculoskeletal pain complaints.^{25,40} Identifying how health behaviors like smoking are associated with chronic pain in young adults will inform the limited research base on modifiable factors that predict the development and persistence of chronic musculoskeletal pain.

Methods

Sample

Young adult twins taking part in this study were participants (ages 18–30 years) from the University of Washington (UW) Twin Registry. The registry consists of a community sample of twins recruited using information from Washington State department of motor vehicle licensing records. All individuals (18 years and older) applying for new driver's licenses in Washington State are asked to indicate if they are a part of a twin pair to avoid issuing duplicate licenses. Lists of all individuals identified as being part of a twin pair are sent to the UW Twin Registry research staff and the eligible twins are sent a letter inviting them to join the registry and to complete a survey of demographic information, health history and health behaviors. Respondents to the 2008 and 2010 surveys were included in the current study. The paper-based survey was sent to participants' homes and returned via mail to the research team. The survey consists of approximately 200 items assessing participants' health, emotions, lifestyle habits, pain, and history of medical problems. Only a portion of the survey was analyzed in the current study. Because the focus of the current study was young adults, only twins 30 years and younger were selected for inclusion. All data collection procedures were approved by the local Institutional Review Board and informed consent was obtained for use of health survey data. A more detailed description of the UW Twin Registry is published elsewhere.^{1,52} Recent publications from this database have focused on associations between: chronic pain and obesity⁵⁹, sleep and body mass index (BMI)⁵⁶, and depression and migraine.⁴⁷

Measures

Sociodemographic Characteristics—Participants completed several items that assess sociodemographic factors including age, sex, education, income, race and zygosity. Zygosity was determined using participants' self-report, including responses to questions on childhood similarity. This method of zygosity assessment has been utilized in other twin research studies with demonstrated accuracy (95–98%) when compared to biological indicators of shared genetics.⁴¹

Chronic Musculoskeletal Pain—Participants were asked to indicate whether or not they had experienced pain in “muscles, joints or bones” that lasted 3 months or longer. Twins who responded “yes” to this prompt were classified as being positive for chronic musculoskeletal pain.

Current Pain—Participants rated current pain intensity using an 11-point numerical rating scale (NRS; 0 “no pain” to 10 “severe pain”), responding to the prompt “Please indicate to what extent you have experienced pain over the past 4 weeks”.

Current and Past Cigarette Use—The following items were used to assess smoking: 1) “Do you currently smoke?” and 2) “Have you smoked at least 100 cigarettes in your entire life?” Participants responded to multiple-choice items indicating “yes” or “no” to each question. Participants who responded “yes” to the question about current smoking were characterized as “current smokers”. Participants were labeled “past smokers” if they responded “yes” to a history of smoking > 100 cigarettes and did *not* currently smoke.

Depression Status—The two item Patient Health Questionnaire (PHQ-2)³⁰ was used to screen for depression. Specifically participants answered the following items: “In the past 4 weeks, how often have you been bothered by the following problems: 1) little interest or pleasure in doing things and 2) feeling down, depressed, or hopeless.” Response options were: 0 = not at all, 1 = several days, 2 = more than half the days, and 3 = nearly every day. Participants who responded with a total score of 3 or higher were identified as being a positive screen for depression. The use of these 2 items as a screen for depression has been validated and used in both adolescent and adult samples.^{3,43}

Anxiety—The Brief Symptom Inventory (BSI), anxiety symptom dimension was used to assess participants’ anxiety symptoms. The six item subscale asks participants to rate distress or bother experienced from symptoms in the last 7 days such as: “nervousness or shakiness inside”, “feeling so restless you couldn’t sit still”, and “suddenly scared for no reason.” Responses range from 0–4 “not at all” to “extremely”. The BSI and individual symptom dimensions have been validated for assessment of psychological symptoms in adolescents and young adults from both clinical and community samples.¹⁰

Stress—The Perceived Stress Scale (PSS)⁸ was used to assess participants’ current perception of stress in their lives. Specific items assess how unpredictable, uncontrollable, and overloaded participants felt during the past 4 weeks. The scale consists of ten items and asks participants to rate frequency of perceived stress. Responses range from 0 – 4 “never” to “very often” and sample items include: “Been upset because of something that happened unexpectedly”, “Felt confident about your ability to handle your personal problems”, and “Felt that you were unable to control the important things in your life.” The four positively stated items were reverse scored and then a total score was obtained by summing across all 10-items. This measure is validated and has been previously used to assess stress in young adults.^{9,21}

Data Analysis

From the total sample of twins in the registry (n=5243), 1588 twins ages 18–30 years met criteria for participation in the current study. Reasons for exclusion were: participants did not have a co-twin participating in the UW Twin Registry (n = 883), indeterminant zygosity (n=96), twins were older than 30 years (n=2246), and data on chronic pain status were missing (n=40). In addition, given the potential associations among sex and chronic pain status, twins who were not the same sex as their co-twin (n=390) were excluded.

Summary statistics were used to describe the demographic characteristics of the sample. Generalized estimating equations (GEE)⁶¹ and chi-square analyses accounting for within-pair correlations were conducted to test equivalencies between groups (positive history of chronic pain versus no chronic pain). GEE regressions accounting for clustering of twin data were used to model the association between smoking (both current and past smoking) and chronic pain. GEE models used an exchangeable correlation structure with robust standard errors.

Initial models tested the associations between smoking (current smoking and past smoking) and chronic musculoskeletal pain for all participants (twins as individuals). Models were first run with covariates alone (age, education, sex), and then psychological factors (anxiety, stress, and depression status) were added. Next we utilized a within-pair analysis (twin-control design) to examine associations among smoking and chronic pain that accounts for confounding due to genetics and shared environmental factors. Finally we compared the size of the odds ratios in the association among smoking and chronic pain in steps one and two. Attenuation in the odds ratio in the within-pair analysis (step two: twin-control design)

relative to the overall effect (step one: twins as individuals) indicates if shared familial factors/genetics contribute to the association between exposure and outcome variables (smoking and chronic pain). Large attenuation would suggest that shared family factors/genetics confound the association among smoking and chronic pain; little or no attenuation would suggest shared family factors/genetics play a minimal role. This statistical approach is common when analyzing twin data.^{2,59} STATA software Version 12 was used for all analyses.⁵⁰

Results

Descriptive characteristics of the sample—Data from 1588 twins (794 pairs) were available for analysis. Demographic characteristics of the individual twins are presented in Table 1. Participants were monozygotic (74.6%) or same-sex dizygotic (25.4%) twin pairs, were primarily female (66.0%), and average age was 23.3 years (SD=3.1). The majority of twins completed high school, with 30.0% of the sample holding a bachelor's degree or higher. Participants worked an average of 5.1 (SD=1.5) days/week and 34.5 (SD=18.02) hours/week.

Current smoking was endorsed by 11.3% of the total sample, with 19.0% reporting having smoked greater than 100 cigarettes during his/her lifetime. Of the participants who reported current smoking, 92.7% endorsed having smoked greater than 100 cigarettes. A history of chronic musculoskeletal pain was identified by 10.58% of participants, with these individuals reporting moderate usual pain intensity over the last 4 weeks (NRS 0–10; M=4.51, SD=2.55). From the total sample of 794 twin pairs, 90 pairs were discordant on current smoking status and 120 pairs were discordant on chronic pain. Twenty pairs were discordant on both smoking and chronic pain.

Group differences by chronic pain status emerged on many key variables and are presented in Table 1. Participants with a history of chronic musculoskeletal pain were more likely to report current smoking ($\chi^2 = 15.17$, $p < .001$). Associations among past smoking and chronic pain were not significant. Participants with chronic musculoskeletal pain also had higher usual pain intensity [$t(1568) = -12.10$, $p < .001$], higher perceived stress [$t(1568) = -3.71$, $p < .01$], greater anxiety [$t(1574) = -5.04$, $p < .001$], and were more likely to meet screening criteria for depression ($\chi^2 = 16.11$, $p < .001$). There were no differences in chronic pain status by demographic characteristics, with groups being equivalent on race, ethnicity, sex, and education status (Bachelor's degree versus less than Bachelor's degree).

Associations among Smoking and Chronic Musculoskeletal Pain: Twins as Individuals—Odds ratios and confidence intervals for the model examining associations among current smoking and chronic pain are presented in Tables 2 and 3. All models included age, sex, and education as covariates. In the overall model (step one: twins as individuals) current smoking was significantly associated with chronic musculoskeletal pain (OR 2.07, 1.32–3.25, $p < .01$). Specifically, individual twins who smoked had a two-fold greater odds of chronic musculoskeletal pain than those who did not smoke. In terms of covariates, age (OR 1.08, 1.02–1.15, $p < .05$) emerged as a significant predictor of chronic pain such that as age increased, rate of chronic pain also increased. The model examining associations between past smoking and chronic musculoskeletal pain was not significant, so all additional analyses were run using only the current smoking variable.

In the model that included psychological factors (anxiety, stress, depression status) the association among smoking and chronic pain remained significant (OR 1.89, 1.17–3.05), with current smoking associated with 1.89 times greater odds for chronic pain. Anxiety emerged as the only significant psychological factor that predicted chronic pain (OR 1.07, 1.01 – 1.12) in this model, with greater anxiety associated with increased likelihood of

having chronic pain. Neither stress nor depression emerged as significant predictors of chronic pain.

Associations among Current Smoking and Chronic Pain: Co-Twin Analyses—

The within-pair association between current smoking and chronic musculoskeletal pain (twin control design) became non-significant both in the model adjusting only for demographics (OR 1.89, 0.81 – 4.42, $p=n.s.$) as well as the model including psychological factors (OR 1.81, 0.73 – 4.48, $p=n.s.$). However, the odds ratios in the two models (twins as individuals versus co-twin design) showed only minimal attenuation suggesting that familial/shared genetic factors do not account for the significant association between current smoking and chronic pain.

Discussion

Results from this study support previous research on associations among smoking and chronic musculoskeletal pain in young adults, with young adult twins who smoked having a near two-fold increase in incidence of chronic pain compared to non-smokers. Twins with chronic pain also had higher anxiety, more stress, and were more likely to meet screening criteria for depression. The small attenuation of associations in the twin-control design compared to the overall model suggests that shared familial factors or genetics may not play a role in associations among smoking and chronic pain. These preliminary findings support the results from two previous twin studies^{22,31} examining associations among young adults with back pain, extending these findings to a broader sample of young adults with musculoskeletal pain. That said, the current work needs to be replicated with a greater number of twin pairs discordant on chronic pain and smoking to see if additional power or a larger sample size is necessary to detect a significant within-pair effect.

The current study extended previous research by including assessment of psychological factors in the relationship between smoking and chronic musculoskeletal pain in a twin sample. Given that the association between current smoking and chronic pain status remained significant even with psychological factors in the model suggests that the association among smoking and chronic pain is at least partially independent of anxiety, stress, and depression status. Future research is needed to examine other psychological factors such as anxiety specific to pain. Previous research has found that increased pain-specific anxiety is associated with a greater expectancy that smoking will decrease negative affect.²⁰ These data suggest that anxiety about pain may reinforce smoking because smoking is viewed as a tool for reducing negative affect. Additional studies should examine pain-related anxiety in young adults, particularly the role of pain-anxiety in smoking initiation and maintenance of chronic pain over time.

Our preliminary findings suggest that shared associations between chronic pain and smoking may not be accounted for by genetics, indicating that researchers need to assess other factors that impact this relationship. For example, the role of attitudes, behaviors, or the direct effects of smoking on pain perception may be important to evaluate. Young adulthood is a time of making significant lifestyle changes (e.g., moving away from home, initiating employment, romantic relationships) that introduce a variety of non-shared factors into twins' lives. Researchers have also hypothesized that genes may influence smoking through factors other than pain, such as choice of peers. For example, one longitudinal twin study found that when accounting for peer smoking status, the effect of the shared home environment was significantly reduced.⁵⁸ Examining how social relationships (e.g., spouses, significant others) influence joint associations among smoking and chronic pain in future twin studies is indicated. This is particularly relevant as research demonstrates the

importance of social environmental factors (e.g., reinforcement of pain behaviors by spouses) in individual responses to chronic pain.^{17,44}

In terms of other non-shared factors, prior research also suggests that type of employment can impact associations among smoking and pain. For example, one recent study identified an association between smoking and low back pain exclusively in individuals who performed heavy physical labor.¹⁵ This suggests that smoking may amplify risk in subsets of individuals based on work or physical requirements. While results from the current study indicated that twins with chronic pain worked more hours than twins without chronic pain, we did not collect data on participants' type of employment. Effect of employment type should be explored in future twin research, particularly as young adulthood is the time the majority of individuals are transitioning into the workforce.

There are several factors that must be taken into account when interpreting these findings. First, the data are cross-sectional and were collected from a single region in the northwestern United States with the majority of participants being Caucasian. Additional research with a more diverse twin sample that examines longitudinal associations among musculoskeletal pain and smoking is indicated. Moreover, because only same-sex dizygotic twins were eligible for the study the majority of the participants were female. It is possible with a larger male sample, associations between smoking, chronic pain, and psychological factors would have been different. The prevalence rate of chronic pain in the current sample may also have impacted results; only 10.58% of participants self-reported a history of pain in "joints, limbs, or muscles" lasting 3 months or greater. This prevalence rate falls within the lower end of the ranges found in previous research examining musculoskeletal pain in pediatric (18 years)²⁹ and young adult populations (25–44 years)⁴⁰ (rates 3.9–40% and 2.6%–25.9% respectively). It is possible that the methodology used to assess chronic musculoskeletal pain affected prevalence rates, and rates may be different if an alternate prompt was used (e.g., specifying pain frequency, pain in last year) or if information was collected by medical record/physician report. Furthermore, current chronic pain status of twins is unknown, as participants reported on history of chronic pain. Despite this limitation on knowledge of current chronic pain, results indicated that twins who endorsed a history of chronic pain rated current pain of moderate intensity ($M=4.51$, 0–10 NRS) and was significantly higher than twins without a history of chronic pain, suggesting that pain persisted for many participants.

It is also important to note that the overall prevalence of current smoking in the total sample is 11.26%, which is lower than some other published data for young adults (e.g., in other studies approximately 20% endorse current smoking).²⁸ The lower prevalence rate found in this study may impact generalizability of the data to other young adult samples, and a higher rate of smoking may have shown different associations with chronic pain. That said, results from the present study demonstrating that 20.24% of twins with chronic pain currently smoke is consistent with rates found in prior research examining associations among chronic pain and smoking in adolescents/young adults (13.9–28.6%).^{22,23,38}

The brief psychological measures used in the current study may also have impacted findings, particularly the use of the PHQ-2 screening tool for measurement of depression. In contrast to previous research,^{42,53} our findings did not reveal significant associations among depression status and chronic pain. While the PHQ-2 is a validated screening measure for depression, it does not provide a comprehensive assessment of depressive symptoms. Replicating these results using a more comprehensive depression measure such as the Beck Depression Inventory⁵ or specifically recruiting a sample of twins with clinical diagnoses of depression is suggested as a future direction.

A final limitation concerns the assessment of smoking. Past smoking was defined as a history of smoking >100 cigarettes. This variable alone does not capture heaviness or duration of tobacco use in past smokers, both factors which may impact chronic pain status. Failure to assess heaviness or duration of smoking may also impact associations among current smoking and chronic pain. While results indicate that 97.2% of twins who currently smoke also had a history of smoking >100 cigarettes, we did not further assess the heaviness of tobacco use or length of time the participant smoked. It is possible that within the group of twins who reported both chronic pain and current smoking, those with heavier or a longer duration of tobacco use had stronger associations between pain and smoking. The role of heaviness and duration of tobacco use can be examined in future research, with an additional focus on how degree of tobacco use is associated with pain-related disability in young adults with chronic pain.

In summary, findings from this paper support associations between smoking and chronic musculoskeletal pain, and indicates that associations persist even when accounting for psychological factors. Clinical implications of this research suggest potential utility in targeting smoking in the context of chronic pain, in particular, teaching alternative strategies for pain coping and reduction of negative affect. In young adults, this may be particularly important as incidence of chronic pain and smoking are both increasing during this time period, and individuals are making more independent decisions about health behaviors. Finally, future longitudinal research can be used to identify youth prior to smoking initiation and chronic pain onset to better identify causal associations.

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Perspective

This article describes associations among musculoskeletal pain and smoking in young adult twins taking into account psychological symptoms. Findings highlight the importance of non-shared factors in associations among pain and smoking, and highlight the need to explore the roles of lifestyle, individual attitudes, and direct effects of smoking on pain.

Table 1

Demographic characteristics of the sample with group differences by chronic pain status.

Characteristic	Overall (N=1588)	Chronic Pain (N=168)	No Chronic Pain (N=1420)	² or t statistic	P-value
Age in years: Mean (SD)	23.27 (3.13)	24.04 (3.29)	23.18 (3.10)	t = -3.36	<.05
Gender, n (%)					
Male	539 (33.9%)	49 (29.17%)	490 (34.51%)	² = 1.91	.20
Female	1049 (66.06%)	119 (70.83%)	930 (65.49%)		
Race, n (%)					
Caucasian	1320 (83.12%)	143 (85.12%)	1177 (83.89%)	² = .59	.44
Other	260 (16.37%)	26 (15.48%)	236 (16.62%)		
Missing	8 (.50%)	-	-		
Ethnicity, n (%)					
Hispanic	68 (4.28%)	4 (5.88%)	64 (4.56%)	² = 1.72	.19
Non-Hispanic	1503 (94.65%)	64 (94.12%)	1339 (94.30%)		
Missing	17 (1.07%)	-	-		
Education (%)					
< Bachelor's Degree	1103 (69.46%)	115 (68.45%)	988 (69.97%)	² = .16	.69
Bachelor's Degree	477 (30.04%)	53 (31.54%)	424 (30.03%)		
Missing	8 (.50%)	-	-		
Pain Intensity ^a	2.58 (2.76)	4.51 (2.55)	2.35 (2.13)	t = -12.10	<.001
Depression Status (%)					
Depressed	148 (9.34%)	30 (17.86%)	118 (8.33%)	² = 16.11	<.001
Not Depressed	1437 (90.66%)	138 (82.14%)	1299 (91.67%)		
Missing	3 (.19%)	-	-		
Anxiety ^b	2.67 (3.33)	3.89 (4.37)	2.52 (3.16)	t = -5.03	<.001
Perceived Stress ^c	13.95 (6.80)	15.79 (7.17)	13.73 (6.72)	t = -3.71	<.001

Characteristic	Overall (N=1588)	Chronic Pain (N=168)	No Chronic Pain (N=1420)	χ^2 or t statistic	P-value
Current Smoker (%)					
Yes	178 (11.26%)	34 (20.24%)	144 (10.19%)		
No	1413 (88.74%)	144 (79.76%)	1269 (89.81%)	$\chi^2 = 15.17$	<.001
Missing	7	-	-		
Past Smoker (%)					
Yes	137 (8.63%)	15 (8.93%)	122 (8.59%)		
No	1444 (90.93%)	153 (91.07%)	1291 (90.92%)	$\chi^2 = .017$	.89
Missing	7	-	-		

^a n=1568;

^b n=1576;

^c n=1570

Table 2

Current smoking as a predictor of chronic pain status: model including only demographic covariates.

	All twins		Within-Pair	
Predictors	Odds-Ratio	P-value	Odds-Ratio	P-value
Current smoking status				
Smoker	2.07 (1.32–3.25)	<.01	1.89 (.81– 4.42)	n.s.
Non-Smoker	ref			
Age	1.08 (1.02–1.15)	<.01	1.08 (1.02 – 1.15)	<.01
Sex				
Female	.78 (.54–1.14)	n.s.	.78 (.54 – 1.14)	n.s.
Male	ref			
Education				
< Bachelor's Degree	.93 (.61–1.42)	n.s.	.94 (.61 – 1.44)	n.s.
Bachelor's Degree	ref			

Table 3

Current smoking as a predictor of chronic pain status: model including demographic covariates and psychological factors.

	All twins		Within-Pair	
Predictors	Odds-Ratio	P-value	Odds-Ratio	P-value
Current smoking status				
Smoker	1.89 (1.17–3.05)	<.01	1.81 (.73–4.48)	n.s.
Non-Smoker	ref			
Age	1.09 (1.02–1.16)	<.01	1.09 (1.02–1.16)	<.01
Sex				
Female	.88 (.60–1.30)	n.s.	.88 (.60–1.30)	n.s.
Male	ref			
Education				
< Bachelor's Degree	.96 (.63–1.47)	n.s.	.96 (.63–1.48)	n.s.
Bachelor's Degree	ref			
Depression Status				
Depressed	1.20 (.69–2.10)	n.s.	1.20 (.69–2.10)	n.s.
Not Depressed	ref			
Perceived Stress	1.01 (.98 – 1.04)	n.s.	1.01 (.98 – 1.04)	n.s.
Anxiety	1.07 (1.01 – 1.12)	p<.05	1.07 (1.01 – 1.12)	p<.05