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# Allowing cigarette or marijuana smoking in the home and car: prevalence and correlates in a young adult sample

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## Abstract

Given the increased marijuana use, negative health consequences of marijuana secondhand smoke exposure (SHSe) and dearth of research regarding marijuana SHSe in personal settings, we examined the prevalence and correlates of allowing marijuana versus cigarette smoking in personal settings among 2002 online survey respondents at two southeastern US universities in 2013. Findings indicated that 14.5% allowed cigarettes in the home, 17.0% marijuana in the home, 35.9% cigarettes in cars and 27.3% marijuana in cars. Allowing cigarettes in the home was associated with younger age, racial/ethnic minority status, living off campus, personal marijuana use, parental tobacco use and positive perceptions of cigarettes ( $P < 0.05$ ). Correlates of allowing marijuana in the home included older age, not having children, living off campus, positive perceptions of marijuana and personal, parental and friend marijuana use ( $P < 0.05$ ). Correlates of allowing cigarettes in cars included personal cigarette and marijuana use, parental tobacco and marijuana use, more cigarette-smoking friends and positive perceptions of cigarettes ( $P < 0.05$ ). Correlates of allowing marijuana in cars included being non-Hispanic black; positive perceptions of marijuana; and personal, parental and friend marijuana use ( $P < 0.05$ ). Interventions must target distinct factors influencing policies regarding cigarette versus marijuana use in personal

settings to address the consequences of marijuana and cigarette SHSe.

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## Introduction

Marijuana is the most commonly used illicit drug in the United States. In 2012, there were 18.9 million users reported [1]. In 2012, 7.6 million persons aged 12 or older used marijuana on 20 or more days in the past month, which represents 40.3% of past month marijuana users [1]. The widespread use of marijuana is occurring alongside its legalisation and related decriminalization in the United States [2].

In terms of its health effects, smoking marijuana produces short-term and long-term effects on lung function [3–5] and impaired immunological competence of respiratory systems [6]. In addition, a synergistic effect of tobacco smoking and marijuana use in the development of chronic obstructive pulmonary disease is suggested in one study [7]. This is worth noting, as most marijuana users also smoke tobacco [8]. The relationship between marijuana use and the common smoking-related problems associated with tobacco, such as lung cancer and emphysema, is not clear [4]. Despite this, it is clear that smoking marijuana has adverse effects on respiratory function that are dissimilar to the patterns of damage associated with tobacco smoking [4].

Limited research exists regarding the impact of marijuana secondhand smoke exposure (SHSe). One study found that the number of chemicals present in marijuana smoke were at levels higher than

those present in tobacco smoke [9]. The chemicals included nitric oxide, nitrogen oxide, aromatic amines and hydrogen cyanide. Aromatic amines are responsible for the mutagenic and carcinogenic activity of cigarette condensates [9]. In addition, risk factors of adolescent marijuana use include peer influence, home environment and parental monitoring [10]. Thus, marijuana SHSe in the home may impact health of non-users and increase the likelihood of initiation of use.

The research regarding tobacco SHSe may inform the research regarding marijuana SHSe. SHSe is a human carcinogen for which there is no safe level [11]. In 2004, estimates suggested that 1% of worldwide premature mortality can be attributed to SHSe [12]. There has been tremendous progress in restricting smoking tobacco in public places and work sites. However, personal settings such as homes and vehicles remain a major source of tobacco SHSe for many people [13]. Smoke-free policies in personal places such as homes and cars are associated with reduced smoking among adults and a reduction of SHSe among children and non-smoking adults sharing those personal spaces [13]. Additionally, having smoke-free home policies is associated with reduced cigarette consumption [14], increased quit attempts and reduced chance of relapse [14–16]. Therefore, adopting smoke-free policies in personal spaces can both protect individuals living in the home from SHSe and help smokers quit.

Disparities exist in terms of what population subgroups are less likely to have smoke-free home policies. For example, those with lower incomes [17–21] and blacks [17, 21–23] are less likely to restrict smoking in the home. Other consistent predictors of household smoking bans include the presence of children, the presence of a non-smoking adult in the home and friends and family members who smoke [18–20, 22–27].

Young adulthood is a particularly sensitive time period for experimenting with tobacco and marijuana and establishing household rules regarding such use in their homes and vehicles. Notably, rates of marijuana use are highest among young adults aged 18–25, increasing from 16.1% in 2004 to 18.7% in 2012 [1]. Similarly, in 2012, young

adults aged 18–25 had the highest rate of current use of a tobacco product (38.1%) compared with those 12–17 (8.6%) and those 26 or older (27.0%) [1]. Among young adults, the rates of past month use in 2012 were 31.8% for cigarettes, which was a decline from 40.8% in 2002 [1]. Given the high prevalence of marijuana and cigarette use by this population [1], documenting the prevalence of personal smoke-free policies related to marijuana and cigarette use among this high-risk group and understanding the distinct correlates is important for informing subsequent interventions, campaigns and policies. Smoke-free policies in personal settings may be an effective form of anti-tobacco and -marijuana socialization for young adults [15]. Additionally, these policies may impact level of use by possibly decreasing consumption and may aid in cessation of use.

The Theory of Planned Behavior [28] focuses on attitudes toward a behavior, subjective norms related to a behavior, perceived behavioral control of a behavior and behavioral intention, with the latter construct's variance being explained by attitudes, subjective norms and perceived behavioral control. Attitude encompasses an individual's beliefs about outcomes or attribute of performing a behavior and an individual's evaluations of those outcomes or attributes. Attitudes have shown to be influential in predicting the adoption of smoke-free home rules and are also a correlate of smoke-free homes [29]. Subjective norms are composed of beliefs about whether important social referents approve or disapprove of a given behavior and a person's motivation to comply with those referents. Expectations of important others such as family members and close friends are factors associated with smoke-free homes [14, 15]. Thus, smoke-free homes are an important component of anti-smoking socialization [30]. Attitudes and subjective norms have shown to predict a number of different health behaviors; therefore, it is a useful framework for understanding why people choose to adopt smoke-free home and/or car policies.

Given this theoretical framework and the dearth of knowledge regarding prevalence and correlates of marijuana smoke-free home policies, the aims of the

current study were (i) to examine the extent to which the rules about smoking cigarettes and smoking marijuana in personal settings consistent with one another and (ii) to examine the prevalence and correlates of having a cigarette smoke-free home or car versus a marijuana smoke-free home or car. Specifically, this is the first study to document socio-demographic factors, personal tobacco and marijuana use, social factors associated with tobacco and marijuana use and perceptions of cigarettes and marijuana (i.e. potential for harm or addiction, social acceptability) in relation to having cigarette versus marijuana smoke-free policies in personal settings.

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## Methods

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### Survey participants and procedures

This study is a cross-sectional survey conducted in spring 2013 among students at two universities in the Southeastern United States. Participants were recruited to complete an online survey. A total of 10 000 students (5000 randomly selected students from each university) were recruited, yielding 2002 responses (20.0% response rate), with complete data from 1966 students. Eligibility criteria included being  $\geq 18$  years of age and being enrolled at least part-time at one of the participating colleges. For this survey, students received an e-mail containing a link to the consent form with the alternative of opting out. Students who consented to participate were directed to the online survey. To encourage participation, students received up to three e-mail invitations to participate. As an incentive for participation, all students who completed the survey received a \$10 gift card. Respondents versus non-respondents did not differ in terms of sociodemographics. The Emory University Institutional Review Board approved this study, IRB 00059657.

### Measures

Below we outline our measures, beginning with our primary outcome—personal smoke-free policies regarding cigarettes and marijuana—and then describe our correlates of interest (i.e.

sociodemographics, cigarette and marijuana use, social system influence on use and perceptions of cigarettes and marijuana).

#### *Personal smoke-free policies for cigarettes and marijuana*

Participants were asked, ‘Which statement best describes the rules about smoking cigarettes inside your primary residence, that is, where you live most of the time when you are attending school? Do not include decks, garages or porches: smoking is not allowed anywhere inside your home; smoking is allowed in some places or at some times; or smoking is allowed anywhere inside the home’. This was adapted to refer to marijuana smoking in the home and to refer to cigarette and marijuana smoking in the car [31]. For each variable, we created a dichotomous variable indicating allowing smoking in that setting versus having a complete smoke-free policy.

#### *Sociodemographic characteristics*

We assessed students’ age, gender, race/ethnicity, marital status, household composition and primary residence. Race/ethnicity was categorized as non-Hispanic white, non-Hispanic black and other given the racial/ethnic composition of our sample. Marital status was categorized as married versus other, and primary residence was categorized as on-campus housing, with parents or off campus.

#### *Cigarette and marijuana use*

Participants were asked to report the number of days they smoked cigarettes and used marijuana in the past 30 days [32]. We categorized participants who reported any use in the past 30 days as current users.

#### *Social influence*

Participants were asked, ‘Does any one of your parental figures (select all that apply): Use smoking tobacco (cigarettes, cigars, etc.)? Use marijuana?’ They were also asked, ‘Out of your five closest

friends, how many of them: Smoke cigarettes? Use marijuana?’

### *Perceived harm to health, addictiveness and social acceptability*

Participants were asked the following questions: ‘How “harmful to your health” do you think each of the following products are?’; ‘How “addictive” do you think each of the following products are?’ and ‘How “socially acceptable among your peers” do you think each of the following products are?’ in reference to cigarettes and marijuana [33]. Response options were 1 = ‘not at all’ to 7 = ‘extremely’. We calculated an overall favorability index of each of the tobacco products and marijuana. This was calculated by subtracting the ‘perceived harm’ and the ‘perceived addictiveness’ scores from 7, respectively, and adding it to the ‘social acceptability’ score. Thus, a higher favorability score reflected lower perceived harm and addictiveness and higher perceived social acceptability.

### *Symptoms of health problems*

Participants were asked, ‘In the past 30 days, on how many of those days did you have cough or sore throat?’ and ‘In the past 30 days, on how many of those days did you feel short of breath or tired after regular activities?’ [34].

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## **Data analysis**

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Participant characteristics were summarized using descriptive statistics. We then conducted bivariate analyses using  $\chi^2$  tests for categorical variables and *t*-tests for continuous variables examining factors associated with allowing smoking versus having a complete smoke-free policy in the home and car for cigarettes and marijuana, respectively. Finally, we examined sociodemographic factors, use of tobacco and marijuana, social influence factors and perceptions of each product in relation to allowing smoking versus having a complete smoke-free policy in each environment for cigarettes and marijuana, respectively, using binary logistic regression,

forcing in each of the potential predictors of interest. SPSS 21.0 was used for all data analyses. Statistical significance was set at  $\alpha = 0.05$  for all tests.

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## **Results**

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Participants were an average of 21.02 (SD = 2.00) years of age, 72.1% female and 40.1% non-Hispanic black (Table I). Overall, 16.3% were current cigarette smokers and 19.8% were current marijuana smokers. In addition, 47.2% of cigarette smokers were marijuana users; 38.7% of marijuana users were cigarette smokers.

Of our total sample, 4.1% reported no policy related to cigarette smoking in the home, 10.4% reported a partial policy and 85.5% reported a complete smoke-free policy. Regarding marijuana smoke-free home policies, 7.0% reported no policy, 10.0% reported a partial policy and 83.0% reported a complete policy. Regarding cigarette smoke-free car policies, 8.4% reported no policy, 12.5% reported a partial policy and 64.1% reported a complete smoke-free policy. In terms of marijuana smoke-free car policies, 4.6% reported no policy, 7.6% reported a partial policy and 72.7% reported a complete policy.

There were associations between allowing either cigarette or marijuana smoking in any one setting and allowing cigarette or marijuana smoking in another setting (Table I). Specifically, we found that 124 participants (6.5% of the total sample) allowed both cigarette use and marijuana use in the home. This represented 44.9% of those who allowed cigarette smoking in the home and 38.3% of those who allowed marijuana in the home (Table I). Notably, 75.0% ( $n = 1425$ ) did not allow use of either product in the home. We also found that 132 participants (6.9% of the total sample) allowed both cigarette use and marijuana use in the car. This represented 33.1% of those who allowed cigarette smoking in the car and 58.7% of those who allowed marijuana in the car (not shown in tables). Overall, 60.1% ( $n = 1143$ ) of young adults in this study did not allow use of either cigarettes or marijuana in the car. For each primary outcome, we conducted

**Table 1.** Participant characteristics and bivariate analyses examining differences between those who allow cigarette smoking and marijuana smoking in the home versus not, respectively

Variable	Allow cigarette smoking in the home			Allow marijuana smoking in the home		
	Total M (SD) or n (%)	Yes M (SD) or n (%)	No M (SD) or n (%)	Yes M (SD) or n (%)	No M (SD) or n (%)	P
<i>Sociodemographics</i>						
Age (SD)	21.01 (2.00)	20.91 (1.68)	21.02 (2.05)	21.31 (1.72)	20.94 (2.04)	0.004
Gender (%)						
Male	530 (27.9%)	82 (29.7%)	448 (27.6%)	112 (34.6%)	418 (26.5%)	0.002
Female	1371 (72.1%)	194 (70.3%)	1177 (72.4%)	212 (65.4%)	1159 (73.5%)	
Race/ethnicity (%)						
Non-Hispanic white	746 (39.2%)	82 (29.7%)	664 (40.9%)	149 (46.0%)	597 (37.9%)	0.02
Non-Hispanic black	762 (40.1%)	121 (43.8%)	641 (39.4%)	110 (34.0%)	652 (41.3%)	
Other	393 (20.7%)	73 (26.4%)	320 (19.7%)	65 (20.1%)	328 (20.8%)	
Relationship status (%)						
Married/living with partner	269 (14.2%)	49 (17.8%)	220 (13.5%)	69 (21.3%)	200 (12.7%)	<0.001
Other	1632 (85.8%)	227 (32.2%)	1405 (86.5%)	255 (78.7%)	1377 (87.3%)	
Children in the home (%)						
No	1599 (84.1%)	241 (87.3%)	1358 (83.6%)	303 (93.5%)	1296 (82.2%)	<0.001
Yes	302 (15.9%)	35 (12.7%)	267 (16.4%)	21 (6.5%)	281 (17.8%)	
Primary residence (%)						
On-campus housing	497 (26.1%)	53 (19.2%)	444 (27.3%)	42 (13.0%)	455 (28.9%)	<0.001
With parents	585 (30.8%)	71 (25.7%)	514 (31.6%)	45 (13.9%)	540 (34.2%)	
Off-campus housing	819 (43.1%)	152 (55.1%)	667 (41.0%)	237 (73.1%)	582 (36.9%)	
<i>Substance use</i>						
Past 30-day cigarette smoking (%)	309 (16.3%)	70 (25.4%)	239 (14.7%)	118 (36.4%)	191 (12.1%)	<0.001
Days smoked among smokers (SD)	13.16 (11.74)	13.29 (11.44)	13.13 (11.85)	15.41 (12.04)	11.77 (11.35)	0.008
Past 30-day marijuana use (%)	377 (19.8%)	99 (35.9%)	278 (17.1%)	190 (58.6%)	187 (11.9%)	<0.001
Days used marijuana among users (SD)	11.18 (10.64)	13.07 (11.69)	10.51 (10.19)	14.48 (11.11)	7.85 (9.02)	<0.001
<i>Social factors</i>						
Parental tobacco smoking						
No	1432 (75.3%)	160 (58.0%)	1272 (78.3%)	236 (72.8%)	1196 (75.8%)	0.26
Yes	469 (24.7%)	116 (42.0%)	353 (21.7%)	88 (27.2%)	381 (24.2%)	
Parental marijuana use						
No	1779 (93.6%)	250 (90.6%)	1529 (94.1%)	281 (86.7%)	1498 (95.0%)	<0.001
Yes	122 (6.4%)	26 (9.4%)	96 (5.9%)	43 (13.3%)	79 (5.0%)	

(continued)

**Table I.** *Continued*

Variable	Allow cigarette smoking in the home			Allow marijuana smoking in the home		
	Total <i>M</i> (SD) or <i>n</i> (%)	Yes <i>M</i> (SD) or <i>n</i> (%)	No <i>M</i> (SD) or <i>n</i> (%)	Yes <i>M</i> (SD) or <i>n</i> (%)	No <i>M</i> (SD) or <i>n</i> (%)	<i>P</i>
Number of friends who smoke cigarettes (SD)	1.05 (1.34)	1.23 (1.44)	1.02 (1.32)	1.65 (1.56)	0.92 (1.26)	<0.001
Number of friends who use marijuana (SD)	1.92 (1.85)	2.39 (1.952)	1.84 (1.817)	3.44 (1.56)	1.61 (1.74)	<0.001
<i>Perceptions of cigarettes</i>						
Perceived harm (SD)	6.49 (0.96)	6.20 (1.18)	6.54 (0.91)	6.28 (1.04)	6.53 (0.94)	<0.001
Perceived addictiveness (SD)	6.44 (1.23)	6.33 (1.25)	6.45 (1.23)	6.34 (1.24)	6.46 (1.23)	0.12
Perceived social acceptability (SD)	4.52 (2.01)	4.87 (1.88)	4.46 (2.03)	4.98 (1.92)	4.42 (2.02)	<0.001
<i>Perceptions of marijuana</i>						
Perceived harm (SD)	4.13 (2.14)	3.58 (2.15)	4.23 (2.12)	2.73 (1.67)	4.42 (2.11)	<0.001
Perceived addictiveness (SD)	4.62 (2.23)	4.33 (2.29)	4.67 (2.22)	3.39 (2.06)	4.87 (2.18)	<0.001
Perceived social acceptability (SD)	5.17 (2.05)	5.54 (1.89)	5.11 (2.06)	6.08 (1.37)	4.99 (2.11)	<0.001
<i>Symptoms</i>						
Days of cough/sore throat (SD)	3.61 (5.17)	4.10 (6.03)	3.53 (5.00)	4.42 (6.36)	3.44 (4.87)	0.002
Days of shortness of breath/fatigue (SD)	3.53 (5.94)	4.35 (6.80)	3.39 (5.78)	4.04 (6.23)	3.42 (5.88)	0.09
<i>Smoke-free policies</i>						
Cigarette-free home policy (%)	276 (14.5%)	—	—	124 (38.3%)	152 (9.6%)	<0.001
Allow smoking	1625 (85.5%)	—	—	200 (61.7%)	1425 (90.4%)	
Complete smoke-free policy	324 (17.0%)	124 (44.9%)	200 (12.3%)	—	—	—
Marijuana-free home policy (%)	1577 (83.0%)	152 (55.1%)	1425 (87.7%)	—	—	—
Allow smoking	397 (20.9%)	99 (46.3%)	298 (21.3%)	138 (50.5%)	259 (19.3%)	<0.001
Complete smoke-free policy	1219 (64.1%)	115 (53.7%)	1104 (78.7%)	135 (49.5%)	1084 (80.7%)	
Marijuana-free car policy (%)	231 (12.2%)	61 (28.4%)	170 (12.2%)	120 (43.8%)	111 (23.9%)	<0.001
Allow smoking	1382 (72.7%)	154 (71.6%)	1228 (87.8%)	154 (56.2%)	1228 (76.1%)	
Complete smoke-free policy						

*M*, mean; *SD*, standard deviation.

binary logistic regression models including socio-demographic factors and whether cigarette or marijuana use was allowed in the other settings; as expected, we found universally that allowing smoking of any product in any one location was associated with the others (not presented).

### Allowing cigarette smoking in the home

Allowing cigarette smoking in the home was associated with being non-Hispanic black, place of residence, cigarette use, marijuana use, days of marijuana use among users, parental tobacco use, parental marijuana use, number of friends who smoke cigarettes, number of friends who smoke marijuana, perceptions of the harm and social acceptability of cigarettes and perceptions of the harm, addictiveness and social acceptability of marijuana ( $P < 0.05$ ; Table I). Significant factors associated with allowing smoking in the home included younger age [odds ratio (OR) = 0.94, 95% confidence interval (CI) 0.85, 1.00], minority status (OR = 2.18, CI for non-Hispanic black 1.52, 3.12; CI for other 1.51, 3.16), living off campus (OR = 2.25, CI 1.52, 3.33), marijuana use (OR = 2.02, CI 1.40, 2.93), parental tobacco use (OR = 2.66, CI 1.99, 3.55) and positive perceptions of cigarettes (OR = 1.11, CI 1.05, 1.17; Table III).

### Allowing marijuana smoking in the home

Allowing marijuana smoking in the home was associated with being older, being male, being non-Hispanic white, not having children in the home, living with a partner, place of residence, cigarette use, days of cigarette smoking among smokers, marijuana use, days of marijuana use among users, number of friends who smoke cigarettes, number of friends who smoke marijuana, perceptions of the harm and social acceptability of cigarettes and perceptions of the harm, addictiveness and social acceptability of marijuana ( $P < 0.05$ ; Table I). In the regression, correlates of allowing marijuana smoking in the home included older age (OR = 1.10, CI 1.01, 1.19), not having children (OR = 0.41, CI 0.24, 0.71), living off campus

(OR = 5.34, CI 3.39, 8.41), marijuana use (OR = 3.74, CI 2.64, 5.30), parental marijuana use (OR 2.12, CI 1.26, 3.56), more friends who use marijuana (OR = 1.45, CI 1.31, 1.61) and positive perceptions of marijuana (OR = 1.11, CI 1.06, 1.16; Table III).

### Allowing cigarette smoking in the car

Allowing cigarette smoking in the car was associated with being male, being non-Hispanic white, not having children in the home, place of residence, cigarette use, days of cigarette smoking among smokers, marijuana use, days of marijuana use among users, parental tobacco use, parental marijuana use, number of friends who smoke cigarettes, number of friends who use marijuana, perceptions of the harm, addictiveness and social acceptability of cigarettes and perceptions of the harm, addictiveness and social acceptability of marijuana ( $P < 0.05$ ; Table II). In the regression (Table III), correlates included not identifying as other (OR = 0.66, CI 0.45, 0.96), cigarette (OR = 6.63, CI 4.64, 9.47) and marijuana (OR = 2.33, CI 1.61, 3.37) use, parental tobacco use (OR = 1.47, CI 1.07, 2.02), parental marijuana use (OR = 1.73, CI 1.01, 2.93), more friends who smoke cigarettes (OR = 1.29, CI 1.15, 1.44) and positive perceptions of cigarettes (OR = 1.11, CI 1.05, 1.18).

### Allowing marijuana smoking in the car

Allowing marijuana smoking in the car was associated with being male, ethnicity, not having children in the home, cigarette use, marijuana use, days of marijuana use among users, parental marijuana use, number of friends who smoke cigarettes, number of friends who use marijuana, perceptions of the harm, addictiveness and social acceptability of cigarettes and perceptions of the harm, addictiveness and social acceptability of marijuana ( $P < 0.05$ ; Table II). The regression found that factors correlated with allowing marijuana smoking in the car were being non-Hispanic black (OR = 2.26, CI 1.42, 3.59), marijuana use (OR = 5.77, CI 3.90, 8.54), parental marijuana use (OR = 1.78, CI 1.00, 3.19), more friends who smoke marijuana

**Table II.** Bivariate analyses examining differences between those who allow cigarette smoking or marijuana smoking in the car versus not, respectively

Variable	Allow cigarette smoking in the car			Allow marijuana smoking in the car		
	Yes <i>M</i> (SD) or <i>n</i> (%)	No <i>M</i> (SD) or <i>n</i> (%)	<i>P</i>	Yes <i>M</i> (SD) or <i>n</i> (%)	No <i>M</i> (SD) or <i>n</i> (%)	<i>P</i>
<i>Sociodemographics</i>						
Age (SD)	21.24 (2.07)	21.07 (2.00)	0.15	20.92 (1.60)	21.16 (2.08)	0.10
Gender (%)						
Male	141 (35.5%)	317 (26.0%)	<0.001	84 (36.4%)	378 (26.7%)	0.003
Female	256 (64.5%)	902 (74.0%)		147 (63.6%)	1038 (73.3%)	
Race/ethnicity (%)						
Non-Hispanic white	214 (53.9%)	470 (38.6%)	<0.001	74 (32.0%)	638 (45.1%)	<0.001
Non-Hispanic black	103 (25.9%)	479 (39.3%)		106 (45.9%)	478 (33.8%)	
Other	80 (20.2%)	270 (22.1%)		51 (22.1%)	300 (21.2%)	
Relationship status (%)						
Married/living with partner	68 (17.1%)	176 (14.4%)	0.20	35 (15.2%)	231 (16.3%)	0.70
Other	329 (82.9%)	1043 (85.6%)		196 (84.8%)	1185 (83.7%)	
Children in the home (%)						
No	346 (87.2%)	1000 (82.0%)	0.02	203 (87.9%)	1156 (81.6%)	0.01
Yes	51 (12.8%)	219 (18.0%)		28 (12.1%)	260 (18.4%)	
Primary residence						
On-campus housing	58 (14.6%)	280 (23.0%)	<0.001	46 (19.9%)	294 (21.3%)	0.248
With parents	114 (28.7%)	419 (34.4%)		67 (29.0%)	462 (33.4%)	
Off-campus housing	225 (56.7%)	520 (42.7%)		118 (51.1%)	626 (45.3%)	
<i>Substance Use</i>						
Past 30-day cigarette smoking (%)	198 (49.9%)	77 (6.3%)	<0.001	79 (34.2%)	196 (14.2%)	<0.001
Days smoked among smokers (SD)	16.38 (12.07)	5.77 (7.26)	<0.001	14.20 (11.54)	12.99 (12.05)	0.45
Past 30-day marijuana use (%)	172 (43.3%)	149 (12.2%)	<0.001	159 (68.8%)	163 (11.8%)	<0.001
Days used marijuana among users (SD)	12.85 (10.84)	8.98 (9.90)	0.001	13.60 (10.79)	8.90 (9.94)	<0.001
<i>Social factors</i>						
Parental tobacco smoking						
No	269 (67.8%)	962 (78.9%)	<0.001	166 (71.9%)	1081 (76.3%)	0.16
Yes	128 (32.2%)	257 (21.1%)		65 (28.1%)	335 (23.7%)	
Parental marijuana use						
No	356 (89.7%)	1166 (95.7%)	<0.001	196 (84.8%)	1357 (95.8%)	<0.001
Yes	41 (10.3%)	53 (4.3%)		35 (15.2%)	59 (4.2%)	
No. of friends using cigarettes (SD)	1.97 (1.54)	0.78 (1.16)	<0.001	1.57 (1.53)	0.99 (1.31)	<0.001
No. of friends using marijuana (SD)	2.69 (1.84)	1.61 (1.76)	<0.001	3.74 (1.43)	1.57 (1.72)	<0.001
<i>Perceptions of cigarettes</i>						
Perceived harm (SD)	6.06 (1.20)	6.62 (0.85)	<0.001	6.31 (1.06)	6.51 (0.95)	0.004
Perceived addictiveness (SD)	6.26 (1.24)	6.52 (1.20)	<0.001	6.29 (1.27)	6.48 (2.00)	0.03
Perceived social acceptability (SD)	5.11 (1.74)	4.30 (2.06)	<0.001	4.81 (1.97)	4.46 (2.02)	0.01
<i>Perceptions of marijuana</i>						
Perceived harm (SD)	3.18 (1.97)	4.46 (2.09)	<0.001	2.29 (1.37)	4.47 (2.08)	<0.001
Perceived addictiveness (SD)	3.76 (2.19)	4.92 (2.15)	<0.001	3.23 (2.06)	4.87 (2.16)	<0.001
Perceived social acceptability (SD)	5.52 (1.73)	4.93 (2.14)	<0.001	6.23 (1.20)	4.89 (2.12)	<0.001
<i>Symptoms</i>						
Days of cough/sore throat (SD)	4.34 (5.95)	3.31 (4.76)	<0.001	4.26 (6.19)	3.45 (4.88)	0.03
Days of shortness of breath/fatigue (SD)	4.37 (6.43)	3.01 (5.45)	<0.001	3.90 (5.67)	3.23 (5.74)	0.10

M, mean; SD, standard deviation.



**Table III.** Binary logistic regression models indicating correlates of allowing cigarette or marijuana smoking in the home or car, respectively

Variable	Allow cigarette smoking in the home			Allow marijuana smoking in the home			Allow cigarette smoking in the car			Allow marijuana smoking in the car		
	OR	CI	P	OR	CI	P	OR	CI	P	OR	CI	P
<i>Sociodemographics</i>												
Age	0.94	(0.85–1.00)	0.04	1.10	(1.01–1.19)	0.02	1.02	(0.95–1.10)	0.65	1.00	(0.90–1.11)	0.99
Gender												
Male	Ref	—	—	Ref	—	—	Ref	—	—	Ref	—	—
Female	0.94	(0.69–1.28)	0.69	0.87	(0.62–1.21)	0.39	0.87	(0.64–1.18)	0.37	0.73	(0.50–1.07)	0.10
Race/ethnicity												
Non-Hispanic white	Ref	—	—	Ref	—	—	Ref	—	—	Ref	—	—
Non-Hispanic black	2.18	(1.52–3.12)	<0.001	0.72	(0.49–1.07)	0.10	0.88	(0.62–1.25)	0.47	2.26	(1.42–3.59)	0.001
Other	2.18	(1.51–3.16)	<0.001	0.88	(0.58–1.34)	0.55	0.66	(0.45–0.96)	0.03	1.59	(0.98–2.58)	0.06
Relationship status												
Married/living with partner	Ref	—	—	Ref	—	—	Ref	—	—	Ref	—	—
Other	1.27	(0.86–1.86)	0.23	1.04	(0.70–1.56)	0.84	0.93	(0.62–1.39)	0.72	0.71	(0.42–1.20)	0.20
Children in the home												
No	Ref	—	—	0.41	(0.24–0.71)	0.001	Ref	—	—	Ref	—	—
Yes	0.78	(0.52–1.16)	0.22	0.41	(0.24–0.71)	0.001	0.99	(0.66–1.46)	0.94	0.94	(0.55–1.60)	0.82
Primary residence												
On campus	Ref	—	—	Ref	—	—	Ref	—	—	Ref	—	—
With parents	1.52	(0.98–2.36)	0.06	1.06	(0.61–1.84)	0.83	1.36	(0.87–2.14)	0.17	1.47	(0.83–2.62)	0.19
Off campus	2.25	(1.52–3.33)	<0.001	5.34	(3.39–8.41)	<0.001	1.43	(0.94–2.17)	0.09	1.43	(0.85–2.40)	0.18
<i>Substance use</i>												
Past 30-day cigarette smoking	1.39	(0.92–2.08)	0.12	1.47	(0.98–2.20)	0.06	6.63	(4.64–9.47)	<0.001	1.12	(0.70–1.80)	0.63
Past 30-day marijuana use	2.02	(1.40–2.93)	<0.001	3.74	(2.64–5.30)	<0.001	2.33	(1.61–3.37)	<0.001	5.77	(3.90–8.54)	<0.001
<i>Social factors</i>												
Parental tobacco smoking												
No	Ref	—	—	0.89	(0.62–1.26)	0.54	Ref	—	—	Ref	—	—
Yes	2.66	(1.99–3.55)	<0.001	0.89	(0.62–1.26)	0.54	1.47	(1.07–2.02)	0.02	1.06	(0.70–1.59)	0.79
Parental marijuana use												
No	Ref	—	—	2.12	(1.26–3.56)	0.004	Ref	—	—	Ref	—	—
Yes	0.88	(0.53–1.46)	0.61	2.12	(1.26–3.56)	0.004	1.73	(1.01–2.93)	0.04	1.78	(1.00–3.19)	0.05

(continued)

**Table III.** *Continued*

Variable	Allow cigarette smoking in the home			Allow marijuana smoking in the home			Allow cigarette smoking in the car			Allow marijuana smoking in the car		
	OR	CI	P	OR	CI	P	OR	CI	P	OR	CI	P
No. of friends using cigarettes	0.93	(0.82–1.06)	0.26	0.92	(0.80–1.05)	0.21	1.29	(1.15–1.44)	<0.001	0.96	(0.83–1.12)	0.63
No. of friends using marijuana	1.05	(0.96–1.16)	0.29	1.45	(1.31–1.61)	<0.001	1.05	(0.95–1.16)	0.31	1.45	(1.28–1.64)	<0.001
<i>Positive perceptions</i>												
Cigarettes	1.11	(1.05–1.17)	<0.001	1.03	(0.97–1.09)	0.36	1.11	(1.05–1.18)	<0.001	1.00	(0.94–1.07)	0.94
Marijuana	0.99	(0.96–1.03)	0.76	1.11	(1.06–1.16)	<0.001	1.03	(0.99–1.07)	0.19	1.16	(1.10–1.23)	<0.001

OR, adjusted odds ratio; CI, 95% confidence interval. Nagelkerke  $R^2 = 0.139$ ; 0.449; 0.395; and 0.457, respectively.

(OR = 1.45, CI 1.28, 1.64) and positive perceptions of marijuana (OR = 1.16, CI 1.10, 1.23; Table III).

### Symptoms of cough/sore throat and shortness of breath

In the bivariate analyses (Table I), allowing cigarette smoking in the home was associated with shortness of breath and allowing marijuana smoking in the home was associated with cough/sore throat ( $P < 0.05$ ). Allowing cigarette smoking in the car was associated with cough/sore throat and shortness of breath and fatigue and allowing marijuana smoking in the car was associated with cough/sore throat ( $P < 0.05$ ; see Table II). In the ordinary least squares regression model (not shown in tables), cigarette (Beta: 2.74; 95% CI: 1.53, 3.96;  $P < 0.001$ ) and marijuana use (Beta: 1.37; 95% CI: 0.22, 2.51;  $P = 0.04$ ) predicted total days of cough/sore throat and total days of shortness of breath or fatigue. However, allowing cigarette or marijuana smoking in these settings did not predict these smoking-related symptoms.

### Discussion

This is the first study to document the distinct correlates of allowing marijuana smoking in personal settings versus allowing cigarette smoking in personal settings. Most notably, we documented that three-quarters of young adults in this study did not allow use of either cigarettes or marijuana in the home, and roughly two-thirds did not allow cigarette or marijuana use in the car. Additionally, there is a high concordance between having cigarette and marijuana smoke-free policies in the home and car. Concurrent use of tobacco and marijuana is common [35], which may explain the high concordance between cigarette and marijuana smoke-free home and car policies. More people reported complete cigarette smoke-free home policies (85.5%) than marijuana smoke-free home policies (83.0%). Conversely, more people prohibit the smoking of marijuana in vehicles (72.7%) than cigarettes (64.1%). This might be attributed to the illegal status of marijuana in Georgia, the setting for this

study. Vehicles are more visible to the public; therefore, the legal ramifications of getting caught smoking marijuana may be enough to deter an individual from smoking in that personal setting.

Consumption of cigarettes or marijuana was lower for both groups if they had smoke-free home or car policies. This finding has been consistently found in cross-sectional and longitudinal studies relating to tobacco, as smokers with lighter consumption are more likely to have or adopt smoke-free home or car policies [14, 16, 29, 36, 37]. However, the parallel findings for marijuana are novel, as no prior empirical evidence has addressed these associations.

In line with the Theory of Planned Behavior [28], we documented sociodemographic, personal use, social factors and perceptions of tobacco and marijuana to be associated with allowing smoking of cigarettes and marijuana in personal settings. Sociodemographic factors were significantly associated with allowing smoking in personal settings. Being a member of a minority group was a correlate of allowing cigarette smoking in the home, which is consistent with prior findings indicating that blacks are less likely to report smoke-free home policies [37, 38]. Similarly, being non-Hispanic black was a correlate of allowing marijuana smoking in the car. However, being non-Hispanic black was not associated with allowing marijuana smoking in the home or cigarettes in the car.

Social influences were also associated with the implementation of smoke-free policies for both substances. Parental cigarette use was related to allowing cigarette smoking in personal settings, which is in line with prior research [14], and having more friends who smoke cigarettes was associated with allowing smoking in cars. Regarding marijuana, parental marijuana use and having more friends who use marijuana were associated with allowing marijuana smoking in the home and car. Although no study to our knowledge has looked at correlates of marijuana smoke-free policies, these findings are similar to those found in the tobacco smoke-free home literature [14]. Being surrounded by non-smokers is associated with implementing smoke-free home policies [13, 16, 30, 39], while being

surrounded by important social referents, such as family and friends, who smoke is associated with a lack of such policies [14, 30, 39].

Living off campus (versus on campus or with parents) was associated with allowing smoking of both substances in the home. On-campus housing is typically and increasingly smoke-free; therefore, students have little control over such policies. Similarly, students who live with their parents have little control over smoke-free policies, as parents are typically responsible for the implementation of smoke-free homes. Thus, individuals living off campus, presumably on their own or with roommates of the same age, have the ability to either implement or not implement smoke-free policies in their homes. If they are surrounded by smokers, or live with a smoker, they will be more likely to allow smoking in their homes. Furthermore, they may not have children living with them, which makes them more likely to allow smoking in the home.

Attitudes regarding cigarettes versus marijuana also played an important role in the allowing smoking in personal settings. In this study, cigarettes were perceived to be more harmful to health, more addictive and less socially acceptable than marijuana. The presence of cigarette smoke-free policies in public places may influence perceptions of cigarette smoking as less socially acceptable, while public health messages about cigarette use may contribute to a perception of cigarettes as harmful and addictive. Public health messages about marijuana are not as salient when compared with tobacco, which may contribute to perceptions of low harm and addictiveness. Additionally, participants reported more friends that smoke marijuana than cigarettes on average. This could also contribute to the perception that marijuana use is more socially acceptable.

Having positive perceptions of cigarettes and marijuana was associated with allowing smoking in homes and cars, which is in line with prior findings [29], indicating that smokers who do not believe that cigarette smoke is harmful to health were more likely to smoke in cars with non-smokers. Additionally, this study showed that smokers who did not believe that SHSe was harmful were less

likely to report smoke-free rules in personal settings [29]. Studies have shown that attitudes about cigarette harm are correlates of smoke-free policies [14, 29, 36, 37], and it can be assumed that attitudes about marijuana harm act in the same way to influence smoke-free policies.

Understanding the correlates associated with marijuana smoke-free policies in personal settings has important implications for research and practice. The factors identified by this study may be useful to target in future interventions that seek to promote the adoption of smoke-free policies in personal settings. The implementation of such policies may impact social norms surrounding marijuana use and may be an important component of anti-smoking socialization [15, 30, 39]. The implementation of smoke-free policies will impact the health effects that exposure brings to non-users and children. Additionally, smoke-free policies may impact the level of marijuana use, as they have done for tobacco use [14, 15, 37].

### Limitations

This study has some limitations. First, the survey sample was largely female and drawn from colleges in the Southeastern United States. Despite the fact that this sample reflects the characteristics of these school populations and has good representation of non-Hispanic white and black racial backgrounds, it may not generalize to other college populations. Second, the survey response rate may seem low and suggest responder bias. Also, we are unable to ascertain how many participants did not open the e-mail or had inactive email accounts, which impacts what the true ‘denominator’ for this response rate may have been. In addition, prior work has demonstrated that, despite lower response rates, Internet surveys yield similar statistics regarding health behaviors compared with mail and phone surveys [40]. Also, we did not assess lifetime use of marijuana. Similarly, we did not include other tobacco products (e.g. cigars, hookah and e-cigarettes), which has implications for understanding how the use of alternative tobacco products is regulated in personal settings. Another limitation was the

cross-sectional nature of this study, limiting the extent to which we can make causal attributions. Finally, data regarding whether restrictions on smoking in the home were mandated by a landlord was not collected.

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### Conclusions

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Attitudes about cigarette and marijuana smoking and subjective norms related to these behaviors are important correlates of allowing cigarette and marijuana smoking in personal settings. Although there was a significant overlap between individuals who allowed cigarette and marijuana smoking in homes and cars, there were distinct factors associated with allowing these behaviors. Future research is needed to examine the impact of SHSe from marijuana versus cigarettes and the cumulative impact of both given the high rates of concurrent use of these substances.

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### Conflict of interest statement

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None declared.

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### References

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1. Substance Abuse and Mental Health Services Administration (SAMHSA). *Results from the 2012 National Survey on Drug Use and Health: Summary of National Findings, NSDUH Series H-46*, HHS Publication No. (SMA) 13-4795. Rockville, MD: Substance Abuse and Mental Health Administration, 2013.
2. Room R. Legalizing a market for cannabis for pleasure: Colorado, Washington, Uruguay and beyond. *Addiction* 2013; **109**: 345–51.
3. Hall W, Degenhardt L. Adverse health effects of non-medical cannabis use. *Lancet* 2009; **374**: 1383–91.

4. Lee MH, Hancox RJ. Effects of smoking cannabis on lung function. *Expert Rev Respir Med* 2011; **5**: 537–46.
5. Tetraault JM, Crothers K, Moore BA *et al*. Effects of marijuana smoking on pulmonary function and respiratory complications: a systematic review. *Arch Intern Med* 2007; **167**: 221–8.
6. Tashkin DP, Baldwin GC, Sarafian T *et al*. Respiratory and immunologic consequences of marijuana smoking. *J Clin Pharmacol* 2002; **42**: 71S–81S.
7. Tan WC, Lo C, Jong A *et al*. Marijuana and chronic obstructive lung disease: a population-based study. *Can Med Assoc J* 2009; **180**: 814–20.
8. Moore BA, Augustson EM, Moser RP *et al*. Respiratory effects of marijuana and tobacco use in a U.S. sample. *J Gen Intern Med* 2005; **20**: 33–7.
9. Moir D, Rickert WS, Levasseur G *et al*. A comparison of mainstream and sidestream marijuana and tobacco cigarette smoke produced under two machine smoking conditions. *Chem Res Toxicol* 2008; **21**: 494–502.
10. Hill KG, Hawkins JD, Catalano RF *et al*. Family influences on the risk of daily smoking initiation. *J Adolesc Health* 2005; **37**: 202–10.
11. United States Department of Health and Human Services. *The Health Consequences of Involuntary Exposure to Tobacco Smoke: A Report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, Office on Smoking and Health, 2006.
12. Oberg M, Jaakkola MS, Woodward A *et al*. Worldwide burden of disease from exposure to second-hand smoke: a retrospective analysis of data from 192 countries. *Lancet* 2011; **377**: 139–46.
13. Cartmell KB, Miner C, Carpenter MJ *et al*. Secondhand smoke exposure in young people and parental rules against smoking at home and in the car. *Public Health Rep* 2011; **126**: 575–82.
14. Borland R, Yong HH, Cummings KM *et al*. Determinants and consequences of smoke-free homes: findings from the International Tobacco Control (ITC) Four Country Survey. *Tob Control* 2006; **15**: iii42–50.
15. Clark PI, Schooley MW, Pierce B *et al*. Impact of home smoking rules on smoking patterns among adolescents and young adults. *Prev Chronic Dis* 2006; **3**: A41.
16. Hyland A, Higbee C, Travers MJ *et al*. Smoke-free homes and smoking cessation and relapse in a longitudinal population of adults. *Nicotine Tob Res* 2009; **11**: 614–8.
17. Schuster MA, Franke T, Pham CB. Smoking patterns of household members and visitors in homes with children in the United States. *Arch Pediatr* 2002; **156**: 1094–100.
18. Pizacani BA, Martin DP, Stark MJ *et al*. Household smoking bans: which households have them and do they work? *Prev Med* 2003; **36**: 99–107.
19. Okah FA. Effect of children on home smoking restriction by inner-city smokers. *Pediatrics* 2002; **109**: 244–9.
20. Kegler MC, Malcoe LH. Smoking restrictions in the home and car among rural Native American and white families with young children. *Prev Med* 2002; **35**: 334–42.
21. Norman GJ, Ribisl KM, Howard-Pitney B *et al*. Smoking bans in the home and car: do those who really need them have them? *Prev Med* 1999; **29**: 581–9.
22. Gilpin EA, White MM, Farkas AJ *et al*. Home smoking restrictions: which smokers have them and how they are associated with smoking behavior. *Nicotine Tob Res* 1999; **1**: 153–62.
23. Koepke D, Flay BR, Johnson C. Health behaviors in minority families: the case of cigarette smoking. *Fam Commun Health* 1990; **13**: 35–43.
24. Biener L, Cullen D, Di ZX *et al*. Household smoking restrictions and adolescents' exposure to environmental tobacco smoke. *Prev Med* 1997; **26**: 358–63.
25. Wakefield MA, Chaloupka FJ, Kaufman NJ *et al*. Effect of restrictions on smoking at home, at school, and in public places on teenage smoking: cross sectional study. *BMJ* 2000; **321**: 333–7 [see comment; erratum appears in *BMJ* 2000; **31**: 623].
26. Borland R, Mullins R, Trotter L *et al*. Trends in environmental tobacco smoke restrictions in the home in Victoria, Australia. *Tob Control* 1999; **8**: 266–71.
27. Cummings KM, Markello SJ, Mahoney M *et al*. Measurement of current exposure to environmental tobacco smoke. *Arch Environ Health* 1990; **45**: 74–9.
28. Ajzen I. The theory of planned behavior. *Organ Behav Hum Decis Process* 1991; **50**: 179–211.
29. Hitchman SC, Fong GT, Borland R *et al*. Predictors of smoking in cars with nonsmokers: findings from the 2007 Wave of the International Tobacco Control Four Country Survey. *Nicotine Tob Res* 2010; **12**: 374–80.
30. Kegler MC, Escoffery C, Groff A *et al*. A qualitative study of how families decide to adopt household smoking restrictions. *Fam Commun Health* 2007; **30**: 328–41.
31. World Health Organization (WHO). *Global Adult Tobacco Survey*. 2nd edn. Geneva, Switzerland: World Health Organization, 2012.
32. Centers for Disease Control and Prevention. National Adult Tobacco Survey, 2009–2010. 2011.
33. Berg CJ, Stratton E, Schauer G *et al*. Perceived harm, addictiveness, and social acceptability of tobacco products and marijuana among young adults: marijuana, electronic cigarettes, and hookah win. *Substance Use Misuse* 2015; **50**: 79–89.
34. An LC, Berg CJ, Klatt CM *et al*. Symptoms of cough and shortness of breath among occasional young adult smokers. *Nicotine Tob Res* 2009; **11**: 126–33.
35. Agrawal A, Budney A, Lynskey M. The co-occurring use and misuse of cannabis and tobacco: a review. *Addiction* 2012; **107**: 1221–33.
36. Hitchman SC, Guignard R, Nagelhout GE *et al*. Predictors of car smoking rules among smokers in France, Germany and the Netherlands. *Eur J Public Health* 2012; **22**: 17–22.
37. Mills AL, Messer K, Gilpin EA *et al*. The effect of smoke-free homes on adult smoking behavior: a review. *Nicotine Tob Res* 2009; **11**: 1131–41.
38. King BA, Dube SR, Homa DM. Smoke-free rules and secondhand smoke exposure in homes and vehicles among US adults, 2009–2010. *Prev Chronic Dis* 2013; **10**: E79.
39. Berg CJ, Cox LS, Nazir N *et al*. Correlates of home smoking restrictions among rural smokers. *Nicotine Tob Res* 2006; **8**: 353–60.
40. An LC, Hennrikus DJ, Perry CL *et al*. Feasibility of Internet health screening to recruit college students to an online smoking cessation intervention. *Nicotine Tob Res* 2007; **9**: S11–8.