



Psychosocial and cessation-related differences between tobacco-marijuana co-users and single product users in a college student population



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HIGHLIGHTS

- Importance of quitting cigarettes was higher than of quitting marijuana.
- However, participants reported lower confidence in quitting cigarette use.
- Co-users were more likely to be ready and attempt to quit cigarettes vs. marijuana.
- Predictors of quit-related factors were found among cigarette vs. marijuana users.
- Different cessation intervention targets may be needed in the context of co-use.

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ABSTRACT

Limited research has examined psychosocial factors that differ among cigarette users, marijuana users, and co-users and influence their cessation efforts. We examined: 1) sociodemographic, mental health, and other substance use in relation to user category; and 2) associations among these factors in relation to recent quit attempts and readiness to quit among single product versus co-users. We used a cross-sectional design to study college students aged 18–25 from seven Georgia campuses, focusing on the 721 reporting cigarette and/or marijuana use in the past 4 months (238 cigarette-only; 331 marijuana-only; 152 co-users). Multinomial logistic regression showed that correlates (p 's < 0.05) of cigarette-only versus co-use included attending public or technical colleges (vs. private) and not using little cigars/cigarillos (LCCs), e-cigarettes, and alcohol. Correlates of marijuana-only versus co-use included being Black or Hispanic (vs. White), not attending technical school, and not using LCCs and e-cigarettes. Importance was rated higher for quitting cigarettes versus marijuana, but confidence was rated lower for quitting cigarettes versus marijuana (p 's < 0.001). Co-users were more likely to report readiness to quit and quit attempts of cigarettes versus marijuana (p 's < 0.001). While 23.26% of marijuana-only and 15.13% of cigarette-only users reported readiness to quit, 41.18% of cigarette-only and 21.75% of marijuana-only users reported recent quit attempts (p 's < 0.001). Binary logistic regressions indicated distinct correlates of readiness to quit and quit attempts of cigarettes and marijuana. Cessation efforts of the respective products must attend to co-use with the other product to better understand relative perceptions of importance and confidence in quitting and actual cessation efforts.

1. Introduction

Tobacco use is the leading cause of preventable death in the US (Kuper, Adami, & Boffetta, 2002; Services, U.H.a.H., 2016). While progress has been made in reducing smoking prevalence (Control and Prevention, C.f.D., 2013), cigarette smoking remains prevalent among college students (Sutfin et al., 2012). Additionally, marijuana is the most commonly used federally illicit drug in the US (Services, U.D.o.H.a.H., 2013). As many states and municipalities have begun to

legalize or decriminalize marijuana use (Legislature, 2015), the health effects of marijuana use are still not well understood, particularly among youth and young adults (Bolla et al., 2002; Pope & Yurgelun-Todd, 1996; Volkow et al., 2014).

In this context, the rates of marijuana and tobacco co-use have been increasing in the US (Administration, S.A.a.M.H.S., 2009; Ramo & Prochaska, 2012; Wang et al., 2016). One study showed that roughly 5% of the 2012 NSDUH sample reported past 30-day cigarette and marijuana co-use (Schauer et al., 2015). In this study,

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approximately 26% of cigarette smokers also reported past-month marijuana use, and over 70% of marijuana smokers also smoked cigarettes (Schauer et al., 2015). Tobacco and marijuana have a complementary and synergistic relationship, wherein the effects of one may reinforce and/or enhance the effects of the other, potentially through psychological and/or physiological mechanisms (Ramo, Liu, & Prochaska, 2013; Ramo & Prochaska, 2012). Co-use and cessation within this context is especially important to study given that dual and concurrent use may increase the frequency of tobacco use (Patton et al., 2005), as well as risks of nicotine dependence (Ream et al., 2008) and marijuana dependence (Peters, Budney, & Carroll, 2012; Ream et al., 2008).

While many studies of tobacco and marijuana use exist, there are several gaps in the literature. For example, there is limited research examining the sociodemographic, mental health, and other substance use profiles distinguishing cigarette users, marijuana users, or co-users of both products. One study of 3021 adolescents and young adults found an association between early cigarette use initiation and later abuse of alcohol and tobacco, although early marijuana adoption did not show the same association (Behrendt et al., 2009). Other studies have shown similar connections between cigarette use and future marijuana and drug use, lending plausibility to certain drug use pathways (Beenstock & Rahav, 2002). Not only have studies shown that there may be substance use pathways and connections between tobacco, marijuana, and alcohol, but also that the rates of co-use appear to be increasing in youth (Administration, S.A.a.M.H.S., 2009; Choquet et al., 2004).

Additionally, there have been a number of studies that have shown a positive relationship between increased depressive symptoms and both tobacco and marijuana prevalence and intensity (Degehardt, Hall, & Lynskey, 2003). Studies on tobacco use and depression show a strong and consistent connection (Lenz, 2004; Martini, Wagner, & Anthony, 2002). In addition, multiple studies have shown a link between marijuana use and psychotic or affective mental outcomes (Moore et al., 2007), particularly among younger adolescents. A 2003 study using results from the Child and Adolescent Survey of Mental Health found that marijuana and tobacco co-use was related to greater likelihood of depression diagnosis and psychiatric diagnosis in childhood (Degehardt et al., 2003). In a recent study of college students, marijuana use was identified as a significant correlate of depression score among those that also smoked cigarettes (Ridner, Staten, & Danner, 2005).

A risk behavior associated with co-use of marijuana and cigarettes is the use of other substances, particularly alternative tobacco products (ATPs). The prevalence of ATP use has risen in recent years, and the perceptions of the perceived harm, addictiveness, and social unacceptability of such products has changed (Berg et al., 2015). Additionally, many people utilize ATPs, particularly e-cigarettes, as a tool for quitting the use of cigarettes (Bullen, 2014; Hajek et al., 2014). However, some of these products, particularly little cigars/cigarillos (LCCs) and hookah, may be used in conjunction with marijuana (Golub, Johnson, & Dunlap, 2005; Haardörfer et al., 2016; Mariani et al., 2011; Rabin & George, 2015; Ramo et al., 2013; Soldz, Huyser, & Dorsey, 2003).

Understanding cessation of tobacco and marijuana is essential. Some studies have shown that tobacco cessation is heavily influenced by the use of ATPs, marijuana, and alcohol. A 13-year follow up study of adults in Baltimore found that those who smoked marijuana at baseline were almost twice as likely to still be using tobacco at follow-up, even after adjusting for race, educational attainment, and marital status (Ford, Vu, & Anthony, 2002). There have been a few studies that have indicated that, relative to marijuana-only users, co-users of marijuana and tobacco products have increased likelihood of cannabis use disorders, psychosocial problems, and poorer cannabis cessation outcomes (Peters et al., 2012). However, limited research has examined factors related to marijuana cessation efforts or cessation of either

substance in the context of co-users of both substances.

Additionally, a range of sociodemographic factors may predict use of tobacco and/or marijuana, as well as cessation-related behaviors. For example, men have higher substance use prevalence compared to women (Substance Abuse and Mental Health Services Administration, 2015). Additionally, while Blacks have lower cigarette smoking prevalence than Whites, (Agaku et al., 2014) marijuana use prevalence is roughly equal or higher among Blacks than Whites (Administration, S.A.a.M.H.S., 2015; Wang et al., 2016). Moreover, substance use prevalence has been found to be higher among sexual minorities (Blosnich, Lee, & Horn, 2013; Corliss et al., 2013; Goldbach et al., 2014). Furthermore, smoking prevalence has been shown to be higher among young adult college students attending technical colleges compared to those attending public or private colleges (Berg et al., 2011, 2016a). These factors may also impact cessation efforts and should be considered in examining use, co-use, and cessation-related attitudes and behaviors.

Given the aforementioned research and the gaps in the literature, this study examined: 1) sociodemographic, mental health, and other substance use that may distinguish user categories (cigarette-only, marijuana-only, and co-use) among young adults; and 2) associations of these factors in relation to recent (past 4-month) quit attempts and readiness to quit in the next 30 days among single product users versus co-users.

2. Materials and methods

2.1. Participants and procedures

Project DECOY (Documenting Experiences with Cigarettes and Other Tobacco in Young Adults) is a sequential mixed-methods longitudinal cohort study of 3418 college students attending seven colleges and universities in Georgia (Berg et al., 2016b). Our overall study and reporting approaches were guided by the CHERRIES guidelines (Eysenbach, 2004). This study was approved by the Emory University and ICF International Institutional Review Boards as well as those of the participating colleges.

The study was initiated in 2014. Data were collected from seven Georgia colleges, including two public schools, two private schools, two community/technical colleges, and one historically black university. Detailed descriptions of the recruitment, sampling, and retention procedures can be found elsewhere (Berg et al., 2016a), but described briefly here.

Eligible participants were between 18 and 25 years of age who were able to read English. A list of students was obtained from each institution's office of the registrar. One public and two private universities had 3000 students randomly selected from those that were eligible; the remaining colleges and universities had eligible student bodies that were smaller than 3000, and therefore all eligible students were contacted for enrollment. The invitation emails described the study (longitudinal study with six assessments over 2 years) and the incentives for participating. If potential participants were interested, they clicked on a link embedded in the email, which launched them to the consent form. After reading the consent form, they had the option to consent by clicking a link which then launched the baseline (wave 1) survey. Recruitment at each school was closed after recruitment goals at each school were reached. Response rates ranged from 12.0% to 59.4%, with an overall response rate of 22.9% (N = 3574/15,607) observed within 72 h at each school, meeting recruitment targets. A week after completion of the baseline survey, participants were asked to confirm their participation in the study via an emailed link and were provided their first gift card (\$30). The response rate after confirmation was 95.6% (N = 3418/3574). The baseline sample was largely representative of each school's demographic profile, although respondents were disproportionately female.

Every 4 months, a survey link was sent to participants who received

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