

Correcting Exaggerated Marijuana Use Norms Among College Abstainers: A Preliminary Test of a Preventive Intervention

JENNIFER C. ELLIOTT, PH.D.,^{a,*} AND KATE B. CAREY, PH.D.,^{a,b}

^a*Department of Psychology, Syracuse University, Syracuse, New York*

^b*Department of Behavioral and Social Sciences and the Center for Alcohol and Addiction Studies, Brown University, Providence, Rhode Island*

ABSTRACT. Objective: College students have high rates of marijuana initiation and use, and they report exaggerated perceptions of peers' use. Computerized norm-correcting intervention programs have been developed, but minimal efficacy research has been conducted, especially with regard to preventing the onset of marijuana use. The purpose of this pilot study was to evaluate the efficacy of the Marijuana eCHECKUP TO GO (e-TOKE) for Universities & Colleges program in (a) correcting descriptive norms, (b) correcting injunctive norms, and (c) preventing initiation of marijuana use in a group of college-age abstainers. **Method:** Participants were 245 college students (73% female) recruited from psychology courses for course credit who reported no marijuana use in the past month at baseline. Participants were randomized to receive

the e-TOKE program or assessment only. All participants reported on marijuana use, descriptive norms, and injunctive norms 1 month later. **Results:** Participants receiving the e-TOKE program estimated lower descriptive norms than the control group ($p < .01$), and fewer believed friends disapproved of their choice to abstain ($p < .05$). However, rates of use/initiation did not differ between the two conditions ($p = .18$). **Conclusions:** The current study provides preliminary evidence for the utility of the e-TOKE program in correcting abstainers' misperceptions about others' marijuana use as well as making them perceive less disapproval for their abstention. However, more research with longer follow-ups is necessary to determine if changes in norms affect initiation rates over time. (*J. Stud. Alcohol Drugs*, 73, 976–980, 2012)

THE COLLEGE SETTING IS a high-risk environment for substance use and misuse. This may be fueled in part by the exaggerated perceptions college students have about peer use. The American College Health Association's (ACHA) National College Health Assessment found large discrepancies between actual and perceived marijuana use (ACHA, 2009a). Approximately 15% of students had used marijuana (cannabis) the preceding month. However, students perceived that more than 80% of their peers had used marijuana during that timeframe, representing extremely exaggerated descriptive norms. Although 63.9% had never used the drug, it was perceived that only 8.5% of college students were lifetime abstainers. A subsequent ACHA survey corroborated this pattern of findings (ACHA, 2009b). Perceptions of extremely high use may lead abstainers to reconsider their abstention because perceived norms convey information about what is approved of and perhaps even expected within a peer group (Cialdini and Trost, 1998).

Although American culture views marijuana as a relatively innocuous illicit drug (Johnston et al., 2009), the misuse potential is not negligible. In a group of past-year

college users, one in four met *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (American Psychiatric Association, 1994), criteria for a marijuana (cannabis) use disorder (Caldeira et al., 2008). In light of these relatively high rates of abuse and dependence, initiation of marijuana use should be of concern to clinicians and campus administrators.

Many colleges have begun testing and/or using computerized interventions with norm-correction components to prevent substance use and misuse among college students. Computer-delivered alcohol interventions have become especially popular (Carey et al., 2009; Elliott et al., 2008). Although computerized marijuana interventions for college students have recently been developed, only one published study evaluated the efficacy of such a program. Lee and colleagues (2010) administered a web-based marijuana intervention to recent (past-3-month) users. The intervention involved a norm-correction component and addressed pros and cons of marijuana use, negative consequences, skills for changing use, and alternative campus activities. Although the investigators found no main effects on use frequency or problems, they did find evidence that the intervention may be useful for certain subgroups, including individuals with a family history of drug problems and those with more readiness to change. However, the Lee et al. study did not assess marijuana abstainers and thus did not evaluate whether norm-correcting, web-based marijuana interventions are helpful in preventing marijuana use in those who do not use.

Received: January 10, 2012. Revision: April 4, 2012.

*Correspondence may be sent to Jennifer C. Elliott at the Department of Psychology, Syracuse University, 430 Huntington Hall, Syracuse, NY 13244-2340, or via email at: jcelliot@syr.edu.

We thank the Syracuse University Psychology Department for funding contributions to this project.

The purpose of the current study was to evaluate the effects of a popular web-based marijuana intervention for individuals currently abstaining from marijuana. We tested whether the marijuana intervention known as the Marijuana eCHECKUP TO GO (e-TOKE) for Universities & Colleges (San Diego State University Research Foundation, 2009) is useful in (a) correcting descriptive norms (i.e., perception of others' rates of use), (b) changing injunctive norms (i.e., students' perception of others' approval of their abstention), and (c) preventing initiation of marijuana use. The authors were unable to find any published studies on this widely used intervention (in users or abstainers); therefore, to the authors' knowledge, the present study serves as a preliminary (pilot) test of short-term (1-month) outcomes.

Baseline abstainers serve as a unique population for such an intervention. Given their current decision not to use, such an intervention could conceivably strengthen their pre-existing values, which may be easier to do than to get heavy users to change their views on the drug. Given that the goal for both users and abstainers is the same (to get them to avoid future use), administering this intervention to abstainers may meet less resistance and serve a more affirming but still productive purpose.

Method

Participants

Participants were 245 college students at a large northeastern private university, participating during spring 2011. Recruitment procedures and study design were approved by the university's institutional review board. Participants were recruited from psychology courses for class credit as part of a larger intervention study that also included recent users. Participants were on average 20.5 years of age ($SD = 2.7$), with the majority in their sophomore (34%) or junior (32%) year. Most were women (73%) who self-identified as White (57%). Although no participants were using marijuana at the time of recruitment (as operationalized by no past-month use), approximately half (46%) had tried marijuana at some point in their lives.

Procedure

Participants were deemed eligible if they (a) were 18 years of age or older and (b) responded "no" to the question "Have you used marijuana in the past 30 days?" Two-hundred forty-five eligible participants completed an online baseline survey. Then, 111 students were randomly assigned to receive the intervention, and 134 students were randomly assigned to the assessment-only control condition. The intervention group was given instructions on how to access the baseline survey as well as the e-TOKE program. The control group was given a link to the baseline survey only.

Individuals in the intervention group were assigned identification numbers with which to log into the e-TOKE program. The identification numbers of individuals who had logged in were provided to the first author by the San Diego State University Research Foundation to allow for verification of intervention completion.

One month after the baseline survey (or intervention completion, if later), all participants were emailed the link to the follow-up survey, which assessed the outcomes of interest (descriptive and injunctive norms, marijuana use).

Measures

Descriptive norms. To correspond directly with norms addressed in the intervention, participants were asked to estimate (a) the percentage of college students who use marijuana more than they do and (b) the percentage of college students who do not use at all in a typical month. To supplement these questions, they were also asked to estimate (c) the percentage of college students who have used marijuana in the last month and (d) the percentage of college students who have ever used marijuana in their lifetime.

Injunctive norms. Participants were asked about their perception of their close friends' approval or disapproval of their abstention from marijuana. They indicated what they perceived their close friends' opinions to be, using the choices "approve," "disapprove," or "don't care."

Marijuana use/initiation. Participants were asked to report on marijuana use by stating whether they had used in the previous month.

Intervention

Marijuana eCHECKUP TO GO (e-TOKE) for Universities & Colleges (San Diego State University Research Foundation, 2009). e-TOKE is a brief (approximately 20-minute), web-based prevention and intervention program designed to help college students think carefully about the decision of whether to use marijuana. The program includes several screens of assessment regarding marijuana use, pros and cons, perceived norms of use, other valued activities, involvement with alcohol and cigarettes, and money spent on all substances. Several screens of feedback compare perceived descriptive norms with actual norms, including the percentage of college students using marijuana more than the respondent does and the percentage of college students who do not use at all in a typical month. The intervention also provides feedback on the annual money spent on substances (with comparisons with other possible uses of these funds), suggestions for campus resources that may fit their needs, and possible first steps for decreasing use (for those who use). The program allows participants to complete it at any pace and at any computer with Internet access.

Analysis plan

The focus of the analyses is to determine if exposure to e-TOKE results in differences in norms and use 1 month later, relative to no intervention exposure. Intent-to-treat analyses were conducted. The two conditions were first compared on demographic variables, descriptive norms, and injunctive norms at baseline. In the case of equivalent baseline values, we used one-way analyses of variance (ANOVAs) to assess whether e-TOKE had an effect on descriptive norms. If baseline differences existed, we used analyses of covariance (ANCOVAs) with the baseline values as covariates. Chi-square tests were used to assess the effect of e-TOKE on injunctive norms. Logistic regression was used to assess whether exposure to e-TOKE resulted in fewer baseline abstainers initiating marijuana use in the follow-up month. Finally, we used logistic regression to test whether change in perceived abstinence norms predicts whether individuals initiate use over the month between assessments.

Results

Preliminary analyses

Intervention completion was verified by San Diego State University Research Foundation for all but one participant in the intervention condition, ensuring a high rate of exposure to the intervention. Randomization produced equivalent groups at baseline with respect to gender, age, year in

school, and ethnicity ($ps > .10$). All (descriptive and injunctive) norms estimates except one were equivalent between groups at baseline ($ps > .05$). The one item with pre-existing differences was “What percentage of U.S. college students used marijuana in the last month?” with individuals in the control condition expecting higher rates of use. Selection criteria required that all students abstain from marijuana use in the month before baseline, thus ensuring baseline equivalence in use.

Descriptive norms

Two-group one-way ANOVAs indicated that responses to the three descriptive norms questions with equivalent baselines varied significantly by condition at follow-up ($ps < .01$). An ANCOVA (controlling for baseline for the norm with nonequivalent baseline values) indicated a significant effect for the fourth variable ($p < .01$). For all questions, the participants who received the e-TOKE program reported still elevated, but less exaggerated, norms than participants in the control group (see Table 1 for all results).

Injunctive norms

The e-TOKE and control groups differed significantly in the degree to which they believed friends would approve versus disapprove of their choice to abstain ($p < .05$). Of 110 participants who were assigned to e-TOKE and responded to the injunctive norms question, only 2 (1.8%) thought their friends would disapprove of their abstention. However, 11 of

TABLE 1. Marijuana descriptive norms, injunctive norms, and use/initiation rates for the e-TOKE and control groups at baseline and follow-up

Variable	e-TOKE		Control		Results	
	Baseline <i>M (SD)</i> or %	Follow-up <i>M (SD)</i> or %	Baseline <i>M (SD)</i> or %	Follow-up <i>M (SD)</i> or %	<i>F</i>	<i>p</i>
Descriptive norms						
What percentage of U.S. college students use marijuana more than you do?	60.7 (3.2)	52.4 (26.8)	60.0 (2.6)	63.8 (23.3)	12.66	.0004
What percentage of U.S. college students do not use marijuana at all in a typical month?	46.9 (2.8)	51.5 (22.1)	42.8 (2.7)	39.9 (21.4)	16.88	.0001
What percentage of U.S. college students used marijuana in the last month? ^a	47.8 (2.6)	45.2 (21.7)	57.1 (3.8)	56.7 (20.5)	9.44	.0026
What percentage of U.S. college students used marijuana ever in their lifetime?	72.8 (2.8)	64.7 (21.5)	73.2 (2.0)	72.9 (20.1)	9.38	.0024
					χ^2	<i>p</i>
Injunctive norms						
Percentage stating that friends would . . .					6.12	.047
. . . approve if they abstained from marijuana	40%	48%	46%	39%		
. . . not care if they abstained from marijuana	50%	50%	49%	53%		
. . . disapprove if they abstained from marijuana	10%	2%	5%	8%		
					Odds ratio	<i>p</i>
Marijuana use/initiation						
Percentage who used in past month (i.e., % initiating in past month)	0%	5.5%	0%	11.4%	0.53	.18

Notes: e-TOKE = Marijuana eCHECKUP TO GO for Universities & Colleges (San Diego State University Research Foundation, 2009). ^aAnalysis of covariance controls for baseline value.

the 132 (8.3%) participants in the control group thought their friends would disapprove.

Marijuana use initiation

Of the 109 individuals assigned to e-TOKE (and who responded to the question regarding past-month use at follow-up), only 6 individuals (5.5%) reported initiating marijuana use in the intervening month. Fifteen of the 132 individuals in the control condition (responding to the question) used marijuana during that month (11.4%). Although this difference in proportion corresponds to a small-to-medium effect size ($d = 0.38$), it was not statistically significant (odds ratio [OR] = 0.53, $SE = 0.25$, $z = -1.33$, $p = .18$, 95% CI [0.21, 1.35]).

Change scores for the perceived abstinence rate item were then created, which represented how much individuals increased their estimate of abstinence prevalence over the course of the month after the intervention. Change scores did not predict whether individuals completing the intervention initiated use in the month between baseline and follow-up (OR = 0.98, $SE = 0.03$, $z = -0.59$, $p = .53$, 95% CI [0.92, 1.05]).

Discussion

The current study provides preliminary support for the e-TOKE intervention in correcting abstainers' misconceptions about the prevalence of marijuana use. Baseline abstainers who received the computerized e-TOKE intervention reported less exaggerated descriptive norms at follow-up than did individuals in the control condition. Not only were descriptive norms less exaggerated, but individuals also reported less perceived disapproval from others for their choice to abstain from marijuana. Thus, it appears that the e-TOKE intervention is helpful in partially correcting abstainers' misperceptions about others' marijuana use as well as making individuals sense less disapproval from peers for their abstinence.

However, the rates of marijuana initiation did not significantly vary by condition. Indeed, the number of individuals initiating use was relatively small in both conditions, which could make differences related to the intervention exposure hard to detect. A nonsignificant trend for more initiation was seen in the control condition; therefore, it is possible that group differences would have been detected with a longer follow-up or in a larger sample.

As with any research, the current study has strengths and weaknesses. This study is the first to evaluate efficacy of a program that is being used across the country. Efficacy studies are needed to determine if prevention programs achieve their objectives in order to make good use of students' time and administrators' funds. Also, this study provides evidence that administering a web-based marijuana intervention to

a student body with a minority of marijuana users should not have harmful effects on the majority of nonusers. This finding is consistent with Larimer and colleagues' (2007) findings regarding mailed feedback prevention programs with baseline nondrinkers. However, the current study was relatively brief (because of resource limitations), with follow-up assessments taking place only 1 month after baseline. Studies with longer follow-ups would be more sensitive to detecting a low base-rate behavior such as initiation of marijuana use.

This study has practical implications for college administrators. Because e-TOKE is a brief, easily disseminated, and commercially available program, and it has been shown to change perceived marijuana norms in abstainers, it could serve as a relatively efficient way to conduct a large-scale educational intervention with baseline abstainers. Previous research has established that perceived substance use norms correlate with use (e.g., Martens et al., 2006). Furthermore, reduction in descriptive norms mediates alcohol-intervention effects for college drinkers (Carey et al., 2010). The observed reductions in perceived norms suggest that exposure to e-TOKE provides some protection against perceived social pressures to initiate marijuana use. However, lack of change in marijuana initiation warrants future research before this program is recommended for this purpose.

These findings suggest directions for future research. Given the preliminary nature of this study, it only assessed short-term effects. Additional research is needed to determine if the changes in perceived norms persist over time. Studies with longer follow-ups may also allow changes in use initiation to be detected, which may allow tests of mediation by changes in perceived norms. In addition, research is needed to determine if e-TOKE changes norms and decreases use in current marijuana users; one such study is currently under way by the authors.

References

- American College Health Association. (2009a). *American College Health Association—National College Health Assessment II: Reference Group Executive Summary Spring 2009*. Linthicum, MD: Author.
- American College Health Association. (2009b). *American College Health Association—National College Health Assessment II: Reference Group Executive Summary Fall 2009*. Linthicum, MD: Author.
- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.
- Caldeira, K. M., Arria, A. M., O'Grady, K. E., Vincent, K. B., & Wish, E. D. (2008). The occurrence of cannabis use disorders and other cannabis-related problems among first-year college students. *Addictive Behaviors*, 33, 397–411.
- Carey, K. B., Henson, J. M., Carey, M. P., & Maisto, S. A. (2010). Perceived norms mediate effects of a brief motivational intervention for sanctioned college students. *Clinical Psychology: Science and Practice*, 17, 58–71.
- Carey, K. B., Scott-Sheldon, L. A. J., Elliott, J. C., Bolles, J. R., & Carey, M. P. (2009). Computer-delivered interventions to reduce college student drinking: A meta-analysis. *Addiction*, 104, 1807–1819.
- Cialdini, R. B., & Trost, M. R. (1998). Social influence: Social norms,

- conformity and compliance. In D. T. Gilbert, S. T. Fiske, & G. Lindzey (Eds.), *The handbook of social psychology* (pp. 151–192). New York, NY: McGraw-Hill.
- Elliott, J. C., Carey, K. B., & Bolles, J. R. (2008). Computer-based interventions for college drinking: A qualitative review. *Addictive Behaviors, 33*, 994–1005.
- Johnston, L. D., O'Malley, P. M., Bachman, J. G., & Schulenberg, J. E. (2009). *Monitoring the Future national survey results on drug use, 1975–2008: Volume II, College students and adults ages 19–50* (NIH Publication No. 09-7403). Bethesda, MD: National Institute on Drug Abuse.
- Larimer, M. E., Lee, C. M., Kilmer, J. R., Fabiano, P. M., Stark, C. B., Geisner, I. M., . . . Neighbors, C. (2007). Personalized mailed feedback for college drinking prevention: A randomized clinical trial. *Journal of Consulting and Clinical Psychology, 75*, 285–293.
- Lee, C. M., Neighbors, C., Kilmer, J. R., & Larimer, M. E. (2010). A brief, web-based personalized feedback selective intervention for college student marijuana use: A randomized clinical trial. *Psychology of Addictive Behaviors, 24*, 265–273.
- Martens, M. P., Page, J. C., Mowry, E. S., Damann, K. M., Taylor, K. K., & Cimini, M. D. (2006). Differences between actual and perceived student norms: An examination of alcohol use, drug use, and sexual behavior. *Journal of American College Health, 54*, 295–300.
- San Diego State University Research Foundation. (2009). *Marijuana eCHECKUP TO GO (e-TOKE) for Universities & Colleges*. Retrieved from http://www.echeckuptogo.com/usa/programs/coll_mj.php