Longitudinal Relationships Among Perceived Injunctive and Descriptive Norms and Marijuana Use

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ABSTRACT. Objective: The current study uses longitudinal data to examine the relative influence of perceived descriptive and injunctive norms for proximal and distal referents on marijuana use. **Method:** Participants were 740 undergraduate students (67% female) who completed web-based surveys at two time points 12 months apart. Time 1 measures included reports of marijuana use, approval, perceived descriptive norms, and perceived injunctive norms for the typical student, close friends, and parents. At Time 2, students reported on their marijuana use. **Results:** Results of a path analysis suggest that, after we controlled for Time 1 marijuana use, greater perceived friend approval indirectly predicted Time 2 marijuana use as mediated by personal approval. Greater perceived parental approval was both indirectly and directly associated with greater marijuana use at follow-up. Perceived typical-student descriptive norms were neither directly nor indirectly related to Time 2 marijuana use. **Conclusions:** The findings support the role of proximal injunctive norms in predicting college student marijuana use up to 12 months later. The results indicate the potential importance of developing normative interventions that incorporate the social influences of proximal referents. (*J. Stud. Alcohol Drugs, 77,* 457–463, 2016)

MARIJUANA USE IS PARTICULARLY COMMON among college students: Approximately 49% report having tried marijuana, and 21% report marijuana use in the past 30 days (Johnston et al., 2013). Problematic marijuana use is associated with various negative academic, psychological, and physical consequences (Buckner et al., 2010; Hall, 2009), including memory loss, decreased productivity, anxiety, and depression. The current study examines the relationship between perceived social norms and marijuana use and approval longitudinally. Understanding these relationships could help guide prevention and intervention efforts to reduce marijuana-related harms.

Social norms approach

The social norms approach provides a theoretical framework for understanding how perceptions of the behaviors and attitudes of one's peers can affect one's own marijuana behaviors and attitudes. The approach posits that perceived norms may influence personal use directly by affecting one's behavior and indirectly by affecting one's attitude (Perkins, 1997). Social norms can be categorized into two types: descriptive and injunctive. Perceived descriptive norms refer to beliefs about the prevalence of a specific behavior (i.e., what other people do). In contrast, perceived injunctive norms refer to beliefs regarding the level of approval of specific behaviors (i.e., what other people think) (Cialdini et al., 1990).

According to the social norms theory, our behavior is influenced by (often inaccurate) perceptions of how other members of our social groups think and act (Berkowitz, 2004). With respect to marijuana use, there appears to be a marked tendency for individuals to overestimate use by those in their extended social groups (Page & Scanlan, 1999; Wolfson, 2000). For instance, Kilmer and colleagues (2006) found that although 67.4% of students sampled reported never using marijuana, 98% of students believed that students in general use marijuana at least once per year. Despite the relative prevalence of marijuana use, and contrary to college students' perceptions of use, the majority of college students do not use marijuana on a regular basis. The tendency for overestimation is noteworthy because this model predicts that greater perceived use and approval of marijuana will be associated with an increase in one's own use and approval of marijuana.

Descriptive norms

A number of cross-sectional studies have focused on the role of perceived descriptive norms in predicting marijuana use (Arbour-Nicitopoulos et al., 2010; LaBrie et al., 2009; Lewis & Clemens, 2008; Neighbors et al., 2008a). For ex-

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ample, Arbour-Nicitopoulos and colleagues (2010) showed that perceived marijuana use was found to be a significant predictor of actual use of marijuana. Similarly, greater perceived descriptive norms are uniquely associated with more days of marijuana use in the past 90 days (Neighbors et al., 2008a). Cross-sectional research has also shown that the perceived frequency of marijuana use of one's closest friends is positively associated with one's own marijuana use (Lewis & Clemens, 2008). In general, evidence suggests that descriptive norms are important and robust predictors of marijuana use.

Injunctive norms

Compared with the study of descriptive norms, there has been relatively less research exploring the function of injunctive norms for marijuana use (Wolfson, 2000). Existing data suggest that perceived injunctive norms are predictive of both marijuana approval and use and that the influence of these norms on marijuana outcomes may depend on an individual's level of identification with the reference group (LaBrie et al., 2010a; Neighbors et al., 2008a). Social Comparison Theory (Festinger, 1954) and Social Impact Theory (Latané, 1981) each posit that more socially proximal normative referents (e.g., familiar or similar targets such as friends or family members) should be perceived as more relevant, which renders them more influential than more distal comparison referents (e.g., a typical student). Consistent with this model, cross-sectional research (LaBrie et al., 2010a) suggests that perceived injunctive norms pertaining to close friends and parents are more strongly positively related to personal marijuana attitudes and behaviors than perceived typical-student injunctive norms. Further, in a large multisite study, LaBrie et al. (2011) compared groups of students who varied in their marijuana use (e.g., abstainers through regular users). In general, groups that reported more frequent marijuana use had progressively higher levels of individual approval, perceived close-friend approval, and perceived parental approval of marijuana use. However, perceptions of typical-student approval of marijuana were relatively stable across users groups.

Buckner (2013) extended past research by examining the simultaneous impact of both perceived descriptive norms and injunctive norms for different referent groups on marijuana use and approval, finding that descriptive and injunctive norms for friends were strong predictors of one's own marijuana use. Injunctive norms for parents were also associated with marijuana use, but descriptive norms for students in general were not significantly correlated with frequency of use. This study, however, was limited by its cross-sectional design that prevents inferences about causality. Further, this study did not explore the relative influence of perceived typical-student approval. Because typical-student injunctive norms may be more practical to incorporate in a social norms intervention than friend norms, further longitudinal research that includes perceived injunctive and descriptive norms for a variety of referent groups may provide further insight into the predictors of marijuana use.

Routes of influence

Perceived norms are hypothesized to influence personal use directly by affecting one's behavior and indirectly by affecting one's attitude (Perkins, 1997). For example, believing one's peer group to be approving of marijuana use may influence students to become more approving, and therefore increase their likelihood of marijuana use. It is also possible that regardless of a student's own attitude, if peers are perceived as approving, a student may be more vulnerable to conform to this norm and use marijuana to fit in. Although studies have shown that perceived student and parental norms are associated with personal attitudes (Chawla et al., 2007; Hummer et al., 2013; Neighbors et al., 2008b), there is limited research examining the direct and indirect attitudinal pathways by which perceived norms influence behavior, particularly with respect to marijuana-related behaviors. Research exploring college student alcohol-related behaviors provides some support for attitudes as a mediator of the relationship between perceived norms and behavior. For example, Kenney et al. (2013) found that personal self-approval of driving after drinking mediated the relationship between perceived typical-student injunctive norms of driving after drinking and engaging in the behavior. Further, Rinker and Neighbors (2013) showed that disapproval or lack of interest in drinking temporally mediated the link between perceived friend injunctive drinking norms and later abstinence. In contrast, other longitudinal research has shown that typical-student drinking norms predict drinking behavior, but that attitudes do not mediate this relationship (Lewis et al., 2015).

In the context of marijuana use, LaBrie and colleagues (2010a) provide cross-sectional evidence that the pathways by which perceived norms influence behavior may depend on the type of referent. Although one's own approval of marijuana use fully mediated the relationship between perceived parental injunctive norms and marijuana use, attitudes were found to partially mediate the influence of perceived injunctive norms of friends and typical students. This finding may suggest that although parents' influence is primarily through shaping student attitudes, peers can influence student behavior through other mechanisms that do not involve personal approval. The current study aimed to add to the literature by exploring the mediational role of marijuana attitudes for a variety of perceived norms.

Current study

The current research sought to extend past cross-sectional research by examining the relative impact of descriptive and

injunctive norms on marijuana use and approval using longitudinal data. Based on past literature (Buckner, 2013; LaBrie et al., 2010a), we expected that proximal perceived norms (i.e., friends, parents) would be more strongly associated with one's own marijuana use and approval than more distal typical-student norms. Further, we predicted that students' personal approval would mediate the relationship between Time 1 perceived norms and Time 2 marijuana use.

Method

Procedures and participants

A total of 2,219 undergraduate students from a mid-sized private university were invited to participate in two online surveys conducted 12 months apart. At both time points, a random sample of students who were currently enrolled in the college was obtained from the registrar, and these students were invited via mail and email to participate (more detailed descriptions of Time 1 [T1] and Time 2 [T2] data collection can be found in LaBrie et al., 2010b, 2010c, respectively). Receiving the T2 survey invitation was not contingent on students having responded to the survey invitation at T1. Of the 2,219 students invited to participate, 38.6% did not respond to the invitation to complete either survey, 27.2% only completed one survey (either at T1 or T2), and 34.2% completed both surveys. The current analysis focuses on data from the 740 students who responded to the surveys at both T1 and T2. Participants received a small cash stipend for completing the T1 ($20) and T2 ($15) surveys. The final sample was 67% female, and participants ranged in age from 18 to 23 years (M = 19.28, SD = .88). Students were 59.5% White, 12.9% multiracial, 7.5% Asian, 4.9% Black, 1.9% Native Hawaiian/Pacific Islander, 0.3% American Indian/Alaskan Native, and 13% other.

Actual and perceived marijuana use

At both time points, participants indicated the number of occasions they had used marijuana during the past year. Responses were measured on a 7-point scale ranging from 0 (*never*) to 6 *(≥40 times*) (LaBrie et al., 2010a). At T1, students also completed a measure of descriptive norms (based on LaBrie et al., 2010a): "How many days do you think the typical student smoked marijuana during the past year?" Response options were measured on 10-point scale ranging from 0 (*never*) to 9 (*every day*).

Time 1 actual and perceived marijuana approval

Three items were used to assess personal approval of marijuana use (LaBrie et al., 2010a). Students were asked how much they approve of (a) trying marijuana once or twice, (b) smoking marijuana occasionally, and (c) smoking marijuana regularly. Items were summed to form a measure of personal approval (α = .84). To assess perceived injunctive norms, students were presented with the same three behaviors and asked to indicate how approving they perceived the typical student (α = .82), close friends (α = .86), and parents (α = .79) to be. Responses for personal approval and perceived injunctive norm items were measured using a 7-point scale ranging from 1 (*strongly disapprove*) to 7 (*strongly approve*).

Analysis plan

Path analysis using maximum likelihood estimation was undertaken in MPLUS 6.12 (Muthén & Muthén, 1998–2011) to examine the associations between T1 marijuana use, norms and approval, and T2 marijuana use. Before analysis, variables' distributional properties were examined. For the perceived parental approval measure there were seven outliers (cases with values more than 3 *SD* above the mean), and these extreme values were replaced with adjacent values from the remaining data. Doing so reduced skewness and kurtosis values for this variable from 1.26 and 1.40 to 0.99 and -0.01, respectively. In the initial model, descriptive norms, injunctive norms, and T1 marijuana use were allowed to correlate and were specified to predict students' marijuana approval. Marijuana approval and T1 marijuana use were permitted to predict T2 marijuana use. The adequacy of the proposed model was evaluated with several fit indices (i.e., model chi-square test, comparative fit index [CFI], root mean square error of approximation [RMSEA], standardized root mean square residual [SRMR]).

Results

Bivariate associations

Students' approval of marijuana was positively correlated with all T1 norms measures (Table 1). T2 marijuana use was positively correlated with T1 behavior and approval. In addition, marijuana use at follow-up was positively associated with T1 parental and close-friend injunctive norms. T1 typical-student descriptive or injunctive norms were not associated with marijuana use at T2.

Path analysis

The initial model appeared to be a relatively good fit to the data, $\chi^2(4) = 18.67$, $p < .001$, CFI = .99, SRMR = .02, RMSEA = .07 (90% CI [.04, .10]). Lagrange multiplier tests suggested that the model could be improved by incorporating two additional direct paths from typical-student injunctive norms and parental injunctive norms to T2 behavior. The model was re-estimated and the revised model demonstrated excellent fit, $\chi^2(2) = 1.00$, $p = .61$, CFI = 1.00, SRMR = .00, RMSEA = .00 ([90% CI [.00, .06]). The final model is

TABLE 1. Intercorrelations, means and standard deviations of Time 1 norms, behavior, approval and Time 2 behavior

Variable	*M*	*SD*	1.	2.	3.	4.	5.	6.	7.
1. Typical-student descriptive norm	4.28	1.94	–						
2. Typical-student injunctive norm	4.32	1.23	.35***	–					
3. Friend injunctive norm	3.79	1.61	.19***	.43***	–				
4. Parental injunctive norm	2.02	1.18	.03	.18***	.41***	–			
5. Own approval	3.43	1.53	.13***	.34***	.69***	.51***	–		
6. Time 1 marijuana use	1.21	1.86	.05	.03	.43***	.35***	.56***	–	
7. Time 2 marijuana use	1.28	1.89	.04	-.00	.37***	.36***	.53***	.80***	–

Note: For the means, higher scores indicate more approving attitudes or more frequent marijuana use.
***$p < .001$.

presented in Figure 1. As the initial and revised models are nested, a chi-square difference test was performed. Results indicated that the revised model yielded a significant improvement in model fit, $\chi^2(2)$ diff = 17.68, $p < .001$.

Direct effects

Greater personal approval of marijuana was predicted by more T1 marijuana use (β = .31, *SE* = .03, *Z* = 11.71, $p < .001$) and greater T1 perceived typical-student (β = .11, *SE* = .03, *Z* = 4.15, $p < .001$), close-friend (β = .43, *SE* = .03, *Z* = 14.92, $p < .001$), and parental approval of marijuana (β = .20, *SE* = .03, *Z* = 7.09, $p < .001$) (Figure 1). Consistent with bivariate analyses, T1 perceptions of typical-student marijuana use did not predict approval (β = -.02, *SE* = .03, *Z* = -.63, $p = .53$). Greater T2 marijuana use was predicted by higher levels of T1 marijuana use (β = .70, *SE* = .02, *Z* = 30.97, $p < .001$), personal approval (β = .13, *SE* = .03, *Z* = 4.24, $p < .001$), and perceived parental approval (β = .07, *SE* = .03, *Z* = 2.79, $p = .005$). In addition, after controlling for these variables, a suppression effect emerged. Students who perceived the typical student to be more approving of marijuana at T1 were less likely to use marijuana at T2 (β = -.08, *SE* = .02, *Z* = -3.27, $p = .001$).

Indirect effects

Greater perceived approval of marijuana by friends (β = .06, *SE* = .01, *Z* = 4.06, $p < .001$), parents (β = .03, *SE* = .01, *Z* = 3.73, $p < .001$), and typical students (β = .02, *SE* = .01, *Z* = 2.97, $p = .003$) indirectly contributed to T2 marijuana use as significantly mediated by participants' marijuana approval. Similarly, the relationship between T1 and T2 marijuana use was also partially mediated by participant approval (β = .04, *SE* = .01, *Z* = 4.00, $p < .001$). The indirect effect of descriptive norms on T2 marijuana use was not significant (β = -.002, *SE* = .003, *Z* = -.62, $p = .53$).

Discussion

Marijuana use is a prevalent and potentially problematic behavior in college students. Although several studies indicate that perceived descriptive (e.g., Arbour-Nicitopoulos et al., 2010; Lewis & Clemens, 2008) and injunctive (e.g., Buckner, 2013; LaBrie et al., 2010a; Neighbors et al., 2008a) norms are associated with marijuana outcomes, the fact that this previous research used cross-sectional data limits causal inferences. The current study examined longitudinal pathways through which a range of perceived marijuana-related norms and personal approval of marijuana predicted marijuana use 1 year later. Our findings provide prospective support for social norms interventions by demonstrating that perceived injunctive (but not descriptive) norms predicted marijuana use, both directly and indirectly through personal attitudes, after controlling for baseline marijuana use. Further, consistent with Social Comparison Theory (Festinger, 1954), Social Impact Theory (Latané, 1981), and previous cross-sectional research (Buckner, 2013; LaBrie et al., 2010a), proximal injunctive marijuana norms (i.e., close friend and parent) were more robust predictors of personal marijuana approval and use than more distal norms (i.e., typical students).

In the current study, perceived typical-student injunctive norms were not bivariately associated with marijuana use at either time point. Further, in line with earlier research (e.g., LaBrie et al., 2010a; Lewis & Clemens, 2008), in the path analysis a suppression effect emerged such that perceived typical-student injunctive norms were associated with less marijuana use over time. With respect to typical-student descriptive norms, although a positive association between perceived descriptive norms and substance use has been well established, including in the marijuana literature (Arbour-Nicitopoulos et al., 2010; LaBrie et al., 2009; Neighbors et al., 2008a), in the current model typical-student descriptive norms did not emerge as a significant predictor of marijuana use. In fact, typical-student descriptive norms were not bivariately correlated with marijuana use at either T1 or T2. These findings are consistent with Buckner's (2013) cross-sectional data that also demonstrated a nonsignificant relationship between perceived typical-student descriptive norms and student marijuana use.

Taken together, these typical-student perceived norms findings may reflect that students who use marijuana do not look to the general student body as a normative guide for personal behavior. Rather, their use appears to be more affected by what they think their close friends are doing and

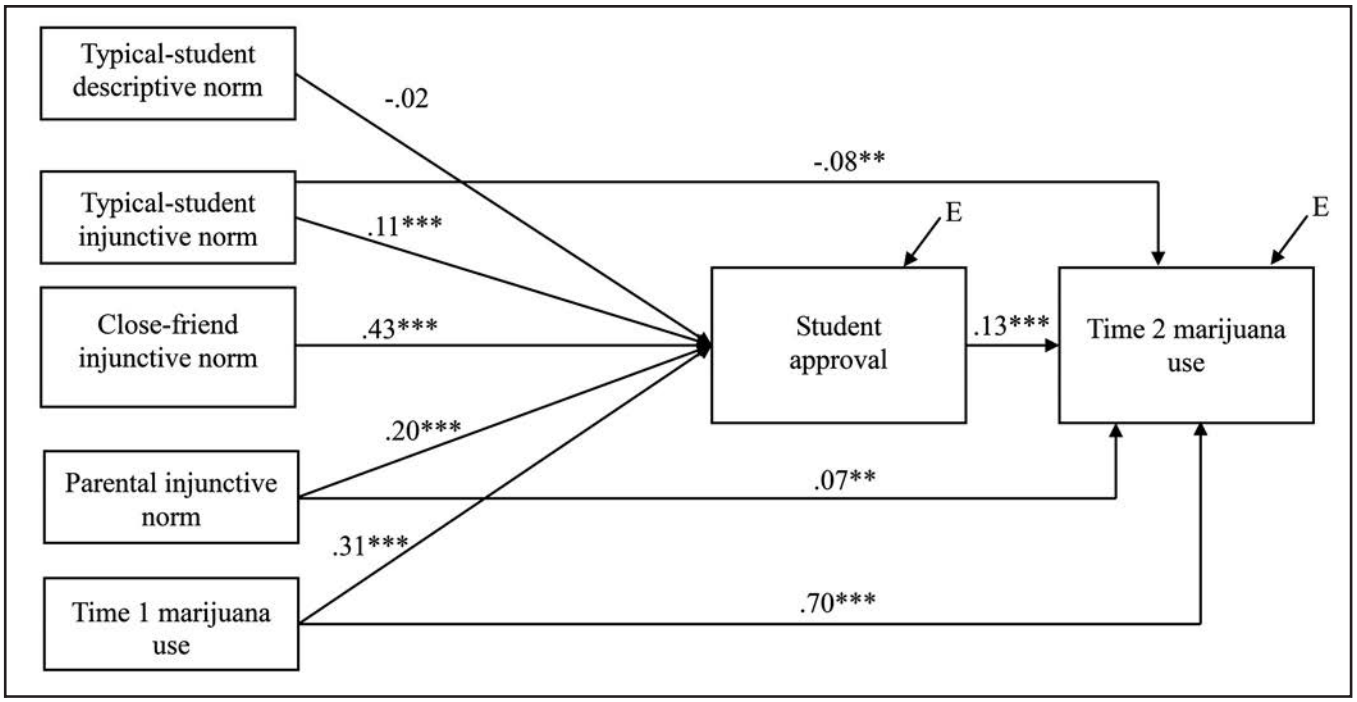

FIGURE 1. Path model, $\chi^2(2, N = 740) = 1.00$, $p = .61$, comparative fit index = 1.00, standardized root mean square residual = .00, root mean square error of approximation = .00, showing standardized coefficients between Time 1 norms, behavior, approval, and Time 2 behavior. Time 1 descriptive norms, injunctive norms, and marijuana use variables were allowed to correlate. (Statistic presented is β.)
$^{**}p < .01$; $^{***}p < .001$.

thinking. Lapinski and Rimal (2005) suggest that the impact of perceived norms may depend on behavioral attributes, including how publicly the behavior is performed. It may be that for the current sample, marijuana use is more likely to occur in private venues with friends than in public and easily observable settings. If students have fewer opportunities to observe and be observed using marijuana, perceived descriptive and injunctive typical-student norms may have less influence (Lapinski & Rimal, 2005). Continued research is needed to determine the contexts in which typical-student descriptive and injunctive norms may be most likely to be associated with marijuana use, particularly in light of the decriminalization or legalization of marijuana use in several states.

Compared with the other norms constructs, perceived injunctive friend norms demonstrated the strongest bivariate relationship with student approval and marijuana use at both time points. The absence of a direct effect of friend norms on T2 marijuana use along with the significant indirect effect suggests that attitudes fully mediated the relationship between perceived friend norms and behavior. That is to say, perceptions of friends' attitudes toward marijuana were associated with an individual's own use over time by informing the degree to which students find various marijuana use behaviors acceptable. This finding is in slight contrast to the social approach model (Perkins, 1997), which predicts partial mediation where perceived friend norms can both influence behavior directly and by shaping personal attitudes. Although the patterns of the mediation results in the current study are not consistent with LaBrie and colleagues' (2010a) cross-sectional model, taken together the results of both studies suggest that the mechanism by which perceived norms influence behavior may depend on the type of norm (descriptive vs. injunctive) and the referent group examined.

The findings that perceived approval of proximal referents were stronger predictors of personal marijuana approval (and in turn later marijuana use) than typical-student norms hold important implications for intervention strategies. One of the most popular college marijuana interventions that incorporates normative feedback is the web-based *Marijuana eCHECKUP TO GO (e-toke) for Universities and Colleges* (San Diego State University Research Foundation, 2009). Among other content, e-toke presents discrepancies (perceived vs. actual) related to typical-student marijuana use. The few studies that have evaluated the efficacy of e-toke versus a control condition have demonstrated that it is associated with reductions in perceived descriptive (Elliott & Carey, 2012; Lewis & Clemens, 2008) and injunctive (Elliott & Carey, 2012) marijuana norms, but not in usage. The results of the current study suggest that the distal feedback presented in e-toke interventions may be ineffective in modifying students' marijuana-related behaviors. Indeed, given the relative importance of close-friend perceived norms, interventions that target social networks of heavy marijuana

users or engage peer leaders in prevention efforts may be a fruitful direction for future research.

In the current study, students' perceived parental attitudes toward marijuana use predicted their marijuana use 1 year later both directly and indirectly through students' personal approval, even after controlling for prior marijuana use and a range of other normative influences. These findings corroborate similar results found in cross-sectional studies (Buckner, 2013; LaBrie et al., 2010a; Wolfson, 2000) and suggest that parents continue to exert influence on students' substance use in college. Given this growing body of research on parental injunctive norms and literature supporting the efficacy of parent-based interventions for college alcohol use (e.g., Ichiyama et al., 2009; Turrisi et al., 2001), interventions that encourage parents to communicate their disapproval toward their children's marijuana use may be a promising avenue, particularly given that college students tend to accurately perceive parental disapproval toward marijuana use (Wolfson, 2000).

Although the focus of the current study was to explore predictors of marijuana use, the ultimate goal of targeted marijuana use interventions is often not only to reduce the use of marijuana, but also to reduce the risk of unwanted negative consequences that can result from heavy marijuana use. As states in the United States continue to legalize recreational use, medicinal use, and personal cultivation of marijuana, harm-reduction initiatives are likely to become increasingly important. Therefore, a crucial next step for marijuana norms research and intervention design will be to understand how perceived norms, individual attitudes, and subsequent marijuana use combine to increase or decrease the risk of concomitant cannabis-related problems.

Limitations

The current study is limited in a number of ways. First, although we emphasized confidentiality of student responses, self-report data may have introduced social desirability bias such that students may have underreported their personal approval and use of marijuana. Second, normative beliefs and personal approval of marijuana were assessed at the same time point (T1), and therefore we cannot assert causal relationships. In fact, one recent study (Lewis et al., 2015) found that alcohol-related attitudes predicted typical-student drinking norms 3 months later, thus indicating that the paths linking norms and approval may be bidirectional. Third, we only assessed typical-student descriptive norms and therefore encourage future studies to examine the influence of more proximal descriptive marijuana norms on prospective marijuana use. Last, the measure of descriptive norms was not on the same response scale as the measure of actual student marijuana use; therefore, we were not able to directly compare these measures and determine if the sample overestimated other students' use of marijuana.

Conclusions

Overall, the current study contributes to the understanding of the stability of relationships between marijuana norms and behavior across one full year. Although previous research has relied on cross-sectional designs, the current study is unique in that it uses longitudinal data. The findings point to the relatively long-term impact of normative influences and may be especially useful in guiding prevention and intervention efforts. The results highlight the importance of injunctive norms, particularly proximal close-friend and parental norms, on college students' marijuana approval and prospective marijuana use. The findings indicate that research exploring the efficacy of prevention approaches that target proximal normative perceptions and attempt to leverage the influence of parents on marijuana use may be beneficial.

References

Arbour-Nicitopoulos, K. P., Kwan, M. Y. W., Lowe, D., Taman, S., & Faulkner, G. E. (2010). Social norms of alcohol, smoking, and marijuana use within a Canadian university setting. *Journal of American College Health, 59,* 191–196. doi:10.1080/07448481.2010.502194

Berkowitz, A. D. (2004). *The social norms approach: Theory, research, and annotated bibliography.* Retrieved from http://www.alanberkowitz.com/articles/social_norms.pdf

Buckner, J. D. (2013). College cannabis use: The unique roles of social norms, motives, and expectancies. *Journal of Studies on Alcohol and Drugs, 74,* 720–726. doi:10.15288/jsad.2013.74.720

Buckner, J. D., Ecker, A. H., & Cohen, A. S. (2010). Mental health problems and interest in marijuana treatment among marijuana-using college students. *Addictive Behaviors, 35,* 826–833. doi:10.1016/j.addbeh.2010.04.001

Chawla, N., Neighbors, C., Lewis, M. A., Lee, C. M., & Larimer, M. E. (2007). Attitudes and perceived approval of drinking as mediators of the relationship between the importance of religion and alcohol use. *Journal of Studies on Alcohol and Drugs, 68,* 410–418. doi:10.15288/jsad.2007.68.410

Cialdini, R. B., Reno, R. R., & Kallgren, C. A. (1990). A focus theory of normative conduct: Recycling the concept of norms to reduce littering in public places. *Journal of Personality and Social Psychology, 58,* 1015–1026. doi:10.1037/0022-3514.58.6.1015

Elliott, J. C., & Carey, K. B. (2012). Correcting exaggerated marijuana use norms among college abstainers: A preliminary test of a preventive intervention. *Journal of Studies on Alcohol and Drugs, 73,* 976–980. doi:10.15288/jsad.2012.73.976

Festinger, L. (1954). A theory of social comparison processes. *Human Relations, 7,* 117–140. doi:10.1177/001872675400700202

Hall, W. (2009). The adverse health effects of cannabis use: What are they, and what are their implications for policy? *International Journal on Drug Policy, 20,* 458–466. doi:10.1016/j.drugpo.2009.02.013

Hummer, J. F., LaBrie, J. W., & Ehret, P. J. (2013). Do as I say, not as you perceive: Examining the roles of perceived parental knowledge and perceived parental approval in college students' alcohol-related approval and behavior. *Parenting: Science and Practice, 13,* 196–212. doi:10.1080/15295192.2013.756356

Ichiyama, M. A., Fairlie, A. M., Wood, M. D., Turrisi, R., Francis, D. P., Ray, A. E., & Stanger, L. A. (2009). A randomized trial of a parent-based intervention on drinking behavior among incoming college freshmen. *Journal of Studies on Alcohol and Drugs, Supplement 16,* 67–76. doi:10.15288/jsads.2009.s16.67

Johnston, L. D., O'Malley, P. M., Bachman, J. G., & Schulenberg, J. E. (2013). *Monitoring the Future national survey results on drug use, 1975–2012: Volume 2, College students and adults ages 19–50.* Ann Arbor, MI: Institute for Social Research, The University of Michigan.

Kenney, S. R., LaBrie, J. W., & Lac, A. (2013). Injunctive peer misperceptions and the mediation of self-approval on risk for driving after drinking among college students. *Journal of Health Communication, 18,* 459–477. doi:10.1080/10810730.2012.727963

Kilmer, J. R., Walker, D. D., Lee, C. M., Palmer, R. S., Mallett, K. A., Fabiano, P., & Larimer, M. E. (2006). Misperceptions of college student marijuana use: Implications for prevention. *Journal of Studies on Alcohol, 67,* 277–281. doi:10.15288/jsa.2006.67.277

LaBrie, J. W., Grossbard, J. R., & Hummer, J. F. (2009). Normative misperceptions and marijuana use among male and female college athletes. *Journal of Applied Sport Psychology, 21, Supplement 1,* S77–S85. doi:10.1080/10413200802582839

LaBrie, J. W., Hummer, J. F., & Lac, A. (2011). Comparing injunctive marijuana use norms of salient reference groups among college student marijuana users and nonusers. *Addictive Behaviors, 36,* 717–720. doi:10.1016/j.addbeh.2011.02.004

LaBrie, J. W., Hummer, J. F., Lac, A., & Lee, C. M. (2010a). Direct and indirect effects of injunctive norms on marijuana use: The role of reference groups. *Journal of Studies on Alcohol and Drugs, 71,* 904–908. doi:10.15288/jsad.2010.71.904

LaBrie, J. W., Hummer, J. F., Neighbors, C., & Larimer, M. E. (2010b). Whose opinion matters? The relationship between injunctive norms and alcohol consequences in college students. *Addictive Behaviors, 35,* 343–349. doi:10.1016/j.addbeh.2009.12.003

LaBrie, J. W., Kenney, S. R., & Lac, A. (2010c). The use of protective behavioral strategies is related to reduced risk in heavy drinking college students with poorer mental and physical health. *Journal of Drug Education, 40,* 361–378. doi:10.2190/DE.40.4.c

Lapinski, M. K., & Rimal, R. N. (2005). An explication of social norms. *Communication Theory, 15,* 127–147. doi:10.1111/j.1468-2885.2005.tb00329.x

Latané, B. (1981). The psychology of social impact. *American Psychologist, 36,* 343–356. doi:10.1037/0003-066X.36.4.343

Lewis, M. A., Litt, D. M., & Neighbors, C. (2015). The chicken or the egg: Examining temporal precedence among attitudes, injunctive norms, and college student drinking. *Journal of Studies on Alcohol and Drugs, 76,* 594–601. doi:10.15288/jsad.2015.76.594

Lewis, T. F., & Clemens, E. (2008). The influence of social norms on college student alcohol and marijuana use. *Journal of College Counseling, 11,* 19–31. doi:10.1002/j.2161-1882.2008.tb00021.x

Muthén, L. K., & Muthén, B. O. (1998–2011). *Mplus user's guide* (6th ed.). Los Angeles, CA: Authors.

Neighbors, C., Geisner, I. M., & Lee, C. M. (2008a). Perceived marijuana norms and social expectancies among entering college student marijuana users. *Psychology of Addictive Behaviors, 22,* 433–438. doi:10.1037/0893-164X.22.3.433

Neighbors, C., O'Connor, R. M., Lewis, M. A., Chawla, N., Lee, C. M., & Fossos, N. (2008b). The relative impact of injunctive norms on college student drinking: The role of reference group. *Psychology of Addictive Behaviors, 22,* 576–581. doi:10.1037/a0013043

Page, R. M., & Scanlan, A. (1999). Perceptions of the prevalence of marijuana use among college students: A comparison between current users and nonusers. *Journal of Child & Adolescent Substance Abuse, 9,* 1–12. doi:10.1300/J029v09n02_01

Perkins, H. W. (1997). College student misperceptions of alcohol and other drug use norms among peers: Exploring causes, consequences, and implications for prevention programs. In *Designing alcohol and other drug prevention programs in higher education: Bringing theory into practice* (pp. 177–206). Newton, MA: Higher Education Center for Alcohol and Other Drug Prevention.

Rinker, D. V., & Neighbors, C. (2013). Reasons for not drinking and perceived injunctive norms as predictors of alcohol abstinence among college students. *Addictive Behaviors, 38,* 2261–2266. doi:10.1016/j.addbeh.2013.02.011

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

Turrisi, R., Jaccard, J., Taki, R., Dunnam, H., & Grimes, J. (2001). Examination of the short-term efficacy of a parent intervention to reduce college student drinking tendencies. *Psychology of Addictive Behaviors, 15,* 366–372. doi:10.1037/0893-164X.15.4.366

Wolfson, S. (2000). Students' estimates of the prevalence of drug use: Evidence for a false consensus effect. *Psychology of Addictive Behaviors, 14,* 295–298. doi:10.1037/0893-164X.14.3.295