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Is Marijuana Identity Associated with Marijuana Use and Consequences? An Examination of Direct and Interactive Associations

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Abstract

Background: There is relatively little research examining the relationship between identity and marijuana-related outcomes (e.g., marijuana use and consequences). Identity may both directly help shape marijuana use behaviors and moderate the influence of other risk factors on marijuana outcomes.

Objectives: The current study examines the relationship between marijuana identity and marijuana-related outcomes among emerging adults and explores whether identity moderates the relationships between non-identity correlates (e.g., perceived norms and negative affect) of marijuana-related outcomes.

Methods: College students who reported marijuana use in the past 12 months completed measures of marijuana identity, perceived norms, negative affect, frequency of marijuana use, and marijuana consequences.

Conclusions/Importance: The results indicated that marijuana identity is associated with marijuana use frequency and moderates the relationship between perceived norms and marijuana consequences. The findings have implications for both identity-based and social norms-based interventions targeting problematic marijuana use among emerging adults.

Keywords

marijuana identity; frequency of marijuana use; perceived marijuana norms; negative affect

1. Introduction

Research related to college marijuana use has received increased attention over the past decade, particularly as states have begun to legalize the sale of marijuana. Marijuana use is common among college students, with past-month use ranging from 15-38% (Pearson, Liese, Dvorak, & Marijuana Outcomes Study Team, 2017). Relative to other lines of addiction research (e.g., alcohol and tobacco), marijuana research is in its relative infancy.

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Thus, research from other substance use domains could help inform the progression of marijuana research. For example, injunctive and descriptive alcohol norms have been found to be associated with alcohol-related outcomes (e.g., alcohol use and alcohol-related consequences; Neighbors, Lee, Lewis, Fossos, & Larimer, 2007; Neighbors, O'Connor, et al., 2008), findings which have been replicated in the examination of marijuana-related outcomes (e.g., marijuana use and marijuana-related consequences; Arbour-Nicitopoulos, Kwan, Lowe, Taman, & Faulkner, 2010; Napper, Kenney, Hummer, Fiorot, & LaBrie, 2016; Neighbors, Foster, Walker, Kilmer, & Lee, 2013; Neighbors, Geisner, & Lee, 2008). There is, however, limited research exploring theoretical moderators of the relationship between predictors (e.g., perceived norms) and marijuana-related outcomes (i.e., frequency of marijuana use and negative marijuana-related consequences [e.g., spending too much money on marijuana, driving a car when high]). In the current study, we examined the potential direct and interactive associations among marijuana identity, perceived norms, and negative affect on marijuana-related outcomes.

1.1 Associations Among Perceived Norms, Negative Affect and Marijuana Outcomes

Research indicates that both perceived norms and negative affect are associated with marijuana-related outcomes (Arbour-Nicitopoulos et al., 2010; Napper, Kenney, et al., 2016; Neighbors, Geisner, et al., 2008; Wills, Sandy, Shinar, & Yaeger, 1999). Perceived norms are often categorized into injunctive norms (e.g., perceptions of other people's approval of marijuana use) and descriptive norms (e.g., estimates of how much or how often other people use marijuana; Cialdini, Reno, & Kallgren, 1990). Among college students, higher injunctive and descriptive norms have generally been found to be associated with higher rates of marijuana use and related consequences (Arbour-Nicitopoulos et al., 2010; Napper, Kenney, et al., 2016; Neighbors, Geisner, et al., 2008). For example, Kilmer and colleagues (2006) found that perceptions of how often friends and students in general use marijuana were associated with college students' own marijuana use. In contrast, longitudinal research (Napper, Kenney et al., 2016) has suggested that perceived injunctive norms (i.e., friend and parent approval) – but not descriptive norms for a typical-student – are prospectively associated with student marijuana use. Currently there is conflicting data on the importance of typical-student perceived norms in predicting marijuana use (Kilmer et al., 2016; Napper, Kenney et al., 2016).

With respect to the relationship between negative affect and marijuana-related outcomes, negative affect has been found to be positively associated with adolescent marijuana use (Wills et al., 1999). One model that has been used to explain the association between marijuana use and negative affect is the self-medication hypothesis (Khantzian, 1985). That is, individuals may use marijuana as a way to alleviate negative affect. Indeed, using marijuana to cope with negative affect (e.g., stress or depressed mood) is commonly reported among young adults (18% of marijuana users; Lee, Neighbors, & Woods, 2007) and is associated with poorer mental health presumably because it is not an effective coping technique (Green & Ritter, 2000). Based on theory and research, we posit that negative affect and perceived norms should be positively associated with marijuana-related outcomes.

1.2 Associations Among Marijuana Identity and Marijuana Outcomes

In the current study, the term “marijuana identity” refers to the centrality of marijuana use to an individual’s self-concept (e.g., the extent to which using marijuana is important to one’s self-image or self/personal identity). From a developmental perspective, exploring the role of marijuana identity during emerging adulthood may be particularly beneficial as this is a period marked by pursuing identity exploration (Arnett, 2000). Identity has been featured as an important component in theories applied to the examination of substance use behavior (Fekadu & Kraft, 2001; Glanz, Rimer, & Viswanath, 2008; Kearney & O’Sullivan, 2003; Sparks & Shepherd, 1992). Specifically, according to the prime theory of motivation (West, 2007), identity is an important source of motivation and is integral to self-regulatory processes. Moreover, the labels associated with an identity (e.g., marijuana user) are associated with rules that guide behavior (e.g., using marijuana). There is a dearth of research examining the relationship between marijuana identity and marijuana-related outcomes.

Drawing from the alcohol literature, alcohol identity has been found to be associated with alcohol-related outcomes, even after controlling for the effects of non-identity correlates of alcohol outcomes (Lindgren, Ramirez, Namaky, Olin, & Teachman, 2016). In Lindgren, Ramirez, Olin and Neighbors’ (2016) study, drinking identity was found to be prospectively associated with alcohol use and problems, even after controlling for injunctive norms, descriptive norms, alcohol expectancies, drinking motives, and implicit identity (e.g., the strength of the association between the self and the concept of drinker in one’s memory). Thus, generalizing from the alcohol literature, we posit that college students’ marijuana identity will be positively associated with marijuana outcomes even after controlling for the effects of other non-identity correlates (e.g., injunctive norms, descriptive norms, and negative affect) of marijuana-related outcomes.

While there is a lack of research exploring marijuana identity, one study examined the role of social identity (i.e., how strongly students affiliate with a social group) as a correlate of marijuana use (Neighbors et al., 2013). In this study, students who more strongly identified with the typical marijuana user reported greater marijuana use. Further, social identity was found to moderate the effects of perceived norms. Perceived descriptive norms were most strongly associated with marijuana use among those who both strongly identified with other marijuana users and had a weak identification with the typical college student. These findings suggest that social identity may be an important correlate of marijuana outcomes and may interact with perceived norms to predict behavior. It is unclear, however, what role marijuana identity plays in marijuana use. While one’s social identity may help shape one’s self identity, it is possible that marijuana identity may function independently of social identity to influence behavior (for example, see Sim, Goyle, McKedy, Eidelman, & Correll, 2014 for a discussion of the independent role of personal identity). The current study extends past research by focusing on marijuana identity rather than social identity.

1.3 Marijuana Identity as a Moderator of Perceived Norms

Theoretically, we would expect that marijuana identity to not only be positively associated with marijuana-related outcomes but to also moderate the association between perceived

norms and marijuana-related outcomes. For example, in an extension of the Theory of Normative Social Behavior (TNPB; Rimal & Real, 2005), Lapinski and Rimal (2005) hypothesized that the relationship between perceived norms and behavior should be strengthened among those who view the behavior as central to their identity. Indeed, past studies have shown that identities associated with specific behaviors do moderate the relationship between descriptive norms and corresponding behaviors in the predicted manner (Lapinski, Zhuang, Koh, & Shi, 2017; Rimal, 2008). It is possible that perceiving others to be approving of, and engaging in, marijuana use makes marijuana identity more salient, thereby increasing the likelihood of personally using marijuana. Based on Lapinski and Rimal (2005), marijuana identity may influence the relationship between perceived norms and marijuana-related outcomes. If marijuana identity does moderate the association between perceived norms and marijuana-related outcomes, this could have implications for social norms intervention efforts that aim to reduce college student marijuana-related outcomes.

1.4 Marijuana Identity as a Moderator of Negative Affect

In addition to perceived norms, marijuana identity may also moderate the relationship between negative affect and marijuana-related outcomes. Given that self-concept is important for guiding behavior (Markus & Wurf, 1987; Stets & Burke, 2000), when marijuana use is more central to identity, marijuana use may become a more salient route to cope with negative affect. Therefore, we might expect there to be a stronger association between negative affect and marijuana use for those who strongly identify as a marijuana user.

1.5 Current Study

In the current study, we extend past research by examining the potential direct and interactive associations among marijuana identity, perceived norms, and negative affect on marijuana-related outcomes in a sample of college students. We hypothesized that marijuana identity would be positively associated with marijuana-related outcomes after controlling for the effects of other non-identity correlates (e.g., injunctive norms, descriptive norms, negative affect). In addition, we hypothesized that marijuana identity would moderate the relationship between non-identity correlates (e.g., perceived norms, negative affect) and marijuana-related outcomes.

2. Method

2.1 Procedures and Participants

A total of 391 undergraduate students from a mid-sized private university in the northeast were recruited through a Psychology Department subject pool. The study was approved by the university's institutional review board. The marijuana measures described below were included as part of a larger 45-60 min, anonymous, computerized survey addressing students' substance use related attitudes and behaviors. For example, prior to completing the marijuana-related measures participants reported on demographics, alcohol-related behaviors and beliefs (i.e., alcohol use, alcohol approval, perceived alcohol norms, and alcohol communication). At the time of data collection, neither medicinal nor recreational

marijuana were legalized in the state where participants resided. The current analyses focus on participants ($n = 211$) who reported marijuana use in the past 12 months. The final sample was 47.4% female with participants' age ranging from 18 to 22 ($M = 18.92$, $SD = 0.96$) years old. Students were 72.0% White, 12.3% Asian, 8.6% Multiracial, 3.3% African American, and 3.8% identified as "other". Approximately 11.4% of participants identified as Hispanic/Latino(a).

2.2 Measures

2.2.1 Frequency of marijuana use.—Participants were asked, "In the past year, how often did you use marijuana?". Responses were measured on a Likert-scale ranging from 0 (*Never*) to 9 (*Everyday*) (based on LaBrie, Hummer, Lac, & Lee, 2010; Napper, Hummer, Chithambo, & LaBrie, 2015). Given that participants were, on average, 18 to 19 years old, some participants may have reported on high school marijuana use behavior.

2.2.2 Marijuana consequences.—Participants completed a modified version of the Rutgers Marijuana Problem Index (RMPI; Simons, Correia, Carey, & Borsari, 1998). The measure contains 18 RMPI items based on the Rutgers Alcohol Problem Index (e.g., neglected responsibilities, not able to do homework or study for a test; White & Labouvie, 1989), plus an additional 10 items used to capture more specific effects associated with marijuana use (Lee et al., 2013; Napper, Froidevaux, & LaBrie, 2016). These additional negative consequences include "not able to pay attention", "had a cough", and "had intense anxiety or panic attacks" because of marijuana use. The response options ranged from 1 (*0 times*) to 5 (*more than 10 times*). A sum composite was created with higher scores indicating a greater number of consequences due to marijuana use ($\alpha = .94$).

2.2.3 Marijuana identity.—Participants completed the 5-item Marijuana Self-Concept Scale ($\alpha = .97$). This scale was adapted from the Smoker Self Concept Scale (Shadel & Mermelstein, 1996), with "smoking" replaced with "marijuana use." For example, participants indicated the extent to which they agreed or disagreed with statements such as, "Marijuana use is part of my self-image" and "Marijuana use is a part of my personality." Responses were measured using a 7-point scale ranging from 1 (*Strongly Disagree*) to 7 (*Strongly Agree*). A mean composite of marijuana identity was computed with higher scores indicating that participants saw marijuana use as more central to their self-concept.

2.2.4 Perceived norms.—Two items were used to assess perceived injunctive norms ($r = .73$, $p < .001$). Students were asked how acceptable (or unacceptable) the typical same-sex same-campus student thought it was to use marijuana "occasionally" and use marijuana "regularly" (LaBrie et al., 2010). Responses ranged from 1 (*Unacceptable*) to 7 (*Acceptable*). Participants also completed a single item assessing descriptive norms. Students indicated how often they thought a same-sex same-campus student uses marijuana (Napper et al., 2015). Responses were measured on a Likert-scale ranging from 0 (*Never*) to 9 (*Everyday*).

2.2.5 Negative affect.—The Depression Anxiety Stress Scale (DASS; Lovibond & Lovibond, 1995) was used to assess negative affect. Participants reported the degree to

which 21 items (e.g., I felt life was meaningless) applied to them over the past week. Response options ranged from 0 (*Did not apply to me at all*) to 3 (*Applied to me very much, or most of the time*). A sum composite was created as a general measure of negative affect ($\alpha = .94$; Ricciardelli & McCabe, 2001). The psychometric properties of the DASS (e.g., internal consistency, concurrent validity) have been found to be in the acceptable to excellent ranges (Antony, Bieling, Cox, Enns, & Swinson, 1998; Henry & Crawford, 2005).

2.3 Analytic Plan

Prior to analyses, the predictor and outcome variables were examined for univariate outliers. In the examination of marijuana identity, eight outliers were identified (i.e., values more than 3 SD above the mean). In order to reduce the impact of these extreme scores, outliers were assigned a value one unit greater than the next most extreme score (Tabachnick & Fidell, 2001). Before hierarchical regression analyses were conducted, regression assumptions were examined and all assumptions were met.

To examine predictors of past-year marijuana use, ordinary least squares regression (OLS) analyses were conducted. Given the positively skewed distribution of the marijuana consequences variable, negative binomial regression analyses were conducted when marijuana consequences served as the outcome variable. Exponentiated parameter estimates from the negative binomial regression are incidence rate ratios that indicate the rate of experiencing marijuana consequence with a one-unit change in the predictor. For both frequency of marijuana use and marijuana consequences as outcome variables, injunctive typical student norms, descriptive typical student norms, marijuana identity, and negative affect were entered in the first step. Interaction terms from the products of identity and other predictors in step one were created and entered in step 2. In the prediction of marijuana consequences, past year marijuana use was also entered as a covariate in the first step. Predictor variables were mean centered to increase interpretability of the results. All significant interaction effects were probed at the 15th and 85th percentile of marijuana identity to examine whether low and high marijuana identity moderated the relationship between predictors (i.e., injunctive norms, descriptive norms, and negative affect) of marijuana-related outcomes.

3. Results

A correlation matrix containing the interrelationships between all study variables can be found in Table 1. In terms of statistically significant correlation coefficients, marijuana identity and marijuana descriptive norms were positively associated with past-year frequency of marijuana use, with the strongest relation found between marijuana identity and frequency of marijuana use ($r = .59, p < .001$). Marijuana identity, descriptive norms, negative affect, and past year marijuana use were all positively associated with marijuana consequences, with the strongest relation found between frequency of marijuana use and marijuana-related consequences ($r = .54, p < .001$).

3.1 Predicting Marijuana Use

Parameter estimates from the hierarchical regression analyses are presented in Table 2. In the model predicting frequency of marijuana use, only marijuana identity was found to be a statistically significant predictor ($B=.22$, $p<.001$). Specifically, those who identified more strongly as a marijuana user reported greater marijuana use. All interaction effects were not statistically significant. This first model, which included all main and interaction effects, accounted for 38% of the variance in frequency of marijuana use.

3.2 Predicting Marijuana Consequences

In the negative binomial model predicting marijuana consequences, negative affect ($e^B=1.01$, $p=.01$) and past-year frequency of marijuana use ($e^B=1.57$, $p<.001$) were statistically significant predictors. Specifically, a one-unit increase in negative affect was associated with a 1% increase in the rate of experiencing marijuana consequences. There was a stronger association between past-year marijuana frequency and marijuana consequences such that a one-unit increase in past-year marijuana frequency was associated with a 57% increase in the rate of experiencing marijuana consequences. In addition, marijuana identity moderated the relationship between injunctive norms and consequences (Figure 1). Among students for whom marijuana use was central to their identity, injunctive norms were positively associated with consequences. Injunctive norms were not positively associated with consequences among those who did not strongly identify as a marijuana user. Marijuana identity was also a significant moderator of the relationship between perceived descriptive norms and consequences (Figure 2). Descriptive norms were positively associated with consequences for those with a weak marijuana identity, but descriptive norms were negatively associated with consequences for those with a strong marijuana identity.

4. Discussion

The current study examined direct and interactive associations among marijuana identity, perceived norms, and negative affect on marijuana-related outcomes. Only marijuana identity was found to be a statistically significant correlate of marijuana use frequency after controlling for the effects of perceived norms and negative affect. That is, marijuana identity explained unique variance in the frequency of marijuana use that was not accounted for by the other variables in the model. With respect to marijuana-related consequences, marijuana identity was found to moderate the association between perceived norms and consequences. These findings highlight the importance of examining the direct and interactive associations among marijuana identity, perceived norms, and negative affect on marijuana-related outcomes during emerging adulthood.

The current study extends past research examining the role of social identity in predicting marijuana use (Neighbors et al., 2013) and replicates research in the alcohol literature (Lindgren, Ramirez, Namaky, et al., 2016) by demonstrating that marijuana identity is associated with marijuana use after controlling for a variety of other non-identity factors. The findings suggest that our beliefs about whether marijuana use is an important aspect of who we are may be more important in predicting marijuana use than perceptions of whether other people use marijuana or approve of this behavior. Whereas the salience of others'

behaviors and opinions may vary as a function of our social context, once an identity as a marijuana user is established, it may play a unique and central role in guiding marijuana use.

Past-year marijuana use frequency was the strongest statistically significant correlate of marijuana consequences, a finding consistent with the extant literature (Simons, Dvorak, Merrill, & Read, 2012). It is not surprising that a one-unit increase in frequency of marijuana use was associated with a 57% increase in the rate of experiencing marijuana consequences. However, given that frequency of marijuana use did not predict all of the variance in consequences, it would appear that there are other important correlates of marijuana consequences that should be investigated in future studies (e.g., protective behavioral strategies, positive urgency, negative urgency; Wilson, Montes, Bravo, Conner, & Pearson, 2018).

Negative affect also emerged as a significant correlate of marijuana consequences. This finding is consistent with previous research (e.g., Hyman & Sinha, 2009; Simons & Carey, 2002) suggesting that students who experience greater negative affect (e.g., depression, anxiety, stress) are more likely to have negative experiences due to marijuana use. Contrary to our hypotheses, marijuana identity did not moderate the relationship between negative affect and frequency of marijuana use. This may suggest that marijuana identity is not associated with coping motives for use. Regardless of marijuana identity, students experiencing poor mental health may be an important target of college marijuana interventions. The current findings indicate that treatment and interventions aimed at reducing marijuana use frequency and negative affect (e.g., Barlow, Allen, & Choate, 2016) may promote reductions in the marijuana consequences that college marijuana users experience.

While marijuana identity did not directly predict marijuana consequences, it was found to interact with perceived norms. For example, injunctive marijuana norms were positively associated with marijuana consequences among participants who strongly identified as a marijuana user. This finding is consistent with Lapinski and Rimal's (2005) hypothesis that the relationship between perceived norms and marijuana use should be strengthened among those who view marijuana use as central to their identity. Students who strongly identify as a marijuana user appear to be particularly sensitive to others' opinions when making decisions about using marijuana in ways that may lead to marijuana consequences. It may be that those who have a strong marijuana identity and perceive others to be approving of marijuana use either use marijuana in greater quantities or in ways that increase their odds of experiencing marijuana consequences (e.g., using marijuana with other substances, not using protective strategies). Further studies exploring whether marijuana identity predicts the use of protective behavioral strategies for marijuana use (see Pedersen, Hummer, Rinker, Traylor, & Neighbors, 2016) may be beneficial.

Inconsistent with Lapinski and Rimal's (2005) predictions, descriptive marijuana norms were more strongly positively associated with marijuana consequences among participants with a weak marijuana identity. This suggests that those who do not consider marijuana use to be central to their self-concept may be more likely to conform to perceptions of typical student marijuana use in ways that increase their risk of experiencing marijuana

consequences. Given that conformity marijuana motives are predictive of marijuana consequences (Simons et al., 1998), future research is needed to examine whether conformity motives interact with marijuana identity to predict marijuana consequences.

The current results also suggest that descriptive norms of typical students are negatively associated with marijuana consequences among participants who strongly identified as a marijuana user – findings which are also inconsistent with Lapinski and Rimal's (2005) predictions. A possible explanation for this finding is that marijuana use may serve as way to stand out or differentiate oneself from typical college students (e.g., Blanton & Christie, 2003; Dvorak, Pearson, Neighbors, & Martens, 2015; Ferrer, Dillard, & Klein, 2012). Indeed, research indicates that substance use can be motivated by a type of sensation seeking directed at rebelling against social norms (Kopstein, Crum, Celentano, & Martin, 2001; Miles et al., 2001). Although speculative, participants who strongly identify as a marijuana user and who believe that the typical student does not frequently use marijuana may be using marijuana to project a risk-taking persona and thus use marijuana in a manner that leads to more marijuana consequences.

4.1 Research and Clinical Implications

The results from the current study add to the literature by highlighting the importance of examining marijuana identity as a correlate of marijuana use and marijuana consequences. Consistent with previous calls to develop interventions aimed at changing substance use identities (e.g., Lindgren, Ramirez, Namaky, et al., 2016; Tombor et al., 2015), the current findings suggest that interventions targeting marijuana identity may be a useful target for future research. For instance, this could involve helping students construct new or strengthening existing non-marijuana related identities. More research is needed to identify effective approaches to elicit identity change, especially given that initial attempts to change implicit behavioral identities have not been successful (Lindgren et al., 2015).

In addition to implications for identity-based interventions, the interaction results from the current study also hold potential to inform social norms interventions targeting marijuana-related outcomes. Currently, there is mixed support for the efficacy of marijuana interventions that incorporate normative feedback. Some studies have found that these interventions have little effect in changing marijuana use and experiencing of marijuana consequences (Elliott, Carey, & Vanable, 2014; Lee, Neighbors, Kilmer, & Larimer, 2010). In contrast, recent research suggests that when normative feedback is incorporated into in-person motivational enhancement therapy, post-intervention changes in perceived norms are associated with reductions in marijuana use (Blevins, Walker, Stephens, Banes, & Roffman, 2018). The current findings have the potential to inform researchers interested in determining what forms of normative feedback might be beneficial and for whom. For instance, the current findings suggest that interventions aimed at correcting descriptive norms may not be effective for those who strongly identify as a marijuana user. Indeed, the results indicate that interventions targeting injunctive norms may have greater utility at reducing marijuana consequences for those who strongly identify as a marijuana user. In contrast, for those who weakly identify as a marijuana user, targeting misperceived descriptive marijuana norms may potentially lead to reductions in marijuana consequences

based on findings from the current study. Research is needed to determine if the efficacy of social norms marijuana interventions is contingent upon participants' identity profiles. A more nuanced understanding concerning the conditions under which social norms interventions targeting marijuana use are effective represent important steps to addressing problematic marijuana use. This includes work to determine if normative feedback interventions could have potential iatrogenic effects for students who do not engage in heavy marijuana use.

4.2 Study Limitations and Future Directions

With respect to study limitations, we analyzed cross-sectional data which precludes inferences pertaining to causality. Relatedly, the extent of reciprocal determinism between marijuana identity and marijuana-related outcomes cannot be accurately estimated. That is, it could be that marijuana-related outcomes influenced marijuana identity (Conner & McMillan, 1999). However, research does indicate that identity-related factors are predictive of alcohol and tobacco use onset (Schwartz, Mason, Pantin, & Szapocznik, 2008); thus, changes in marijuana identity could plausibly influence marijuana-related outcomes. Similarly, it is also plausible that an individual's marijuana identity could influence perceived social norms. Additional longitudinal research is needed to disentangle the causal relationships among identity, perceived social norms, and negative affect on marijuana-related outcomes that were examined in the current study.

In the current study, we did not examine quantity of marijuana use (including potency) and there was a lack of consistency in assessment timeframe (e.g., past-year marijuana use frequency, past 60-days marijuana-related consequences). The specific measurement issues in the current study should be considered within the context of broader measurement issues surrounding the measurement of marijuana use, most notably, how researchers have been unable to accurately assess marijuana intoxication given that various strains of marijuana have different potencies and that individuals may share marijuana during use sessions.

Another limitation in the current study is the self-report nature of the marijuana use and marijuana consequences data collected. Specifically, research indicates that individuals often misreport sensitive information in surveys (Tourangeau & Yan, 2007). Though participants in the current study were reminded that their responses were anonymous, marijuana-related outcomes could have been underreported (Miller et al., 2015). Additional research is needed to examine gender and class differences in identification as a marijuana user. Finding from these studies could provide valuable information as to who should be targeted (e.g., male, female, or both) and when interventions should be administered (e.g., senior year).

In the current study, we only examined perceived norms for a distal normative referent of a typical same-sex college student. It may be that perceived norms for more proximal or more relevant groups (i.e., close friends, marijuana users) would have interacted with marijuana identity to produce a different pattern of results. Similarly, we did not assess marijuana social identity or the degree to which participants have an affinity for, or desire to connect with, other marijuana users. Given that previous research highlighted the importance of social identity (e.g., Neighbors et al., 2013), the examination of both marijuana identity and degree of affiliation with the typical marijuana user would have provided a more nuanced

investigation into how marijuana identity and social identity interact and are associated with marijuana-related outcomes. Indeed, developmental theories of identity formation may help to elucidate the extent to which different identities compete or coalesce to become salient and expressed in different marijuana-using contexts.

Given that emerging adulthood is a time period associated with identity exploration, in addition to exploring identity centrality, examining identity uncertainty more generally may also provide a fruitful avenue for future research aimed at understanding when perceived marijuana norms are most impactful. For example, the Uncertainty–Identity Theory (Hogg, 2012) suggests that when people feel uncertain about their identity they are motivated to resolve this self-uncertainty. One approach to do so is to identify more strongly with a group. In context of marijuana use, it may be that students who experience more self-uncertainty are more susceptible to perceived group norms as part of an effort to belong to a group. Indeed, the current findings that descriptive norms are more closely associated with consequences for those with a weaker marijuana identity may be consistent with this model of identity.

The current study draws on data from a single private university in a state where, at the time of data collection, neither medical nor recreational marijuana were legal. Further research is needed to examine whether the results of the current study generalize to contexts in which marijuana might be more accessible and the risks associated with the legal consequences of use are reduced or eliminated. Moreover, the findings from the current study may not generalize to students who attend public universities, or to non-emerging adults (including those attending college given that older adults may not be as susceptible to normative influences; Ravis & Sheeran, 2003). Indeed, perceived norms may be more strongly associated with behavioral intentions for younger samples (Ravis & Sheeran, 2003). Further, patterns of marijuana use among college students may mean that marijuana identity is particularly likely to moderate perceived norms. For example, marijuana use among college students is commonly a social activity (Buckner, Crosby, Silgado, Wonderlich, & Schmidt, 2012). In this context, a marijuana identity may be more likely to become salient and to strengthen the relationship between perceived norms and behavior.

4.3 Conclusion

By examining the role of marijuana identity, the current study extends past research that has focused on social identity as a correlate of marijuana-related outcomes (Neighbors et al., 2013). Furthermore, the study tests theoretical predictions about how identity and perceived norms should interact to predict behavior (Lapinski & Rimal, 2005). Overall, findings from the current study indicate that marijuana identity is a robust correlate of the frequency of marijuana use. Moreover, marijuana identity was found to moderate the relationship between injunctive and descriptive typical student marijuana norms and marijuana-related consequences. These findings hold potential to inform identity-based and normative-based interventions that aim to reduce heavy marijuana use and related consequences, particularly in college populations.

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Figure 1.

Marijuana identity as a moderator of the relationship between perceived typical student injunctive norms and marijuana-related consequences. The relationship between low (-1 standard deviations from the mean) and high ($+1$ standard deviations from the mean) injunctive norms and marijuana consequences at low (below 15th percentile) and high (above 85th percentile) identification as a marijuana user.

Figure 2.

Marijuana identity as a moderator of the relationship between perceived descriptive norms and marijuana-related consequences. The relationship between low (-1 standard deviations from the mean) and high ($+1$ standard deviations from the mean) descriptive norms and marijuana consequences at low (below 15th percentile) and high (above 85th percentile) identification as a marijuana user.

Table 1.

Correlations and Descriptive Statistics of Key Study Variables

<i>Variables</i>	1	2	3	4	5	<i>M (SD)</i>
1. MJ Use	--					4.16(2.50)
2. MJ Consequences	.54***	--				8.56(13.78)
3. MJ Injunctive Norms	.11	.12	--			5.41(1.48)
4. MJ Descriptive Norms	.25***	.17*	.30***	--		4.68(1.74)
5. Identity	.59***	.45***	.06	.25***	--	3.83(6.54)
6. Negative Affect	.03	.21**	.03	.15*	.10	28.53(22.75)

Note. MJ = Marijuana. *M* = Mean, *SD* = Standard Deviation.

* $p < .05$

**

$p < .01$

***

$p < .001$

Table 2.
Hierarchical Regression: Predicting Frequency of Marijuana Use and Consequences

Marijuana Use (OLS)	R^2	B	SE	β
Step 1: Main Effects	.37			
MJ Injunctive Norms		.08	.10	.05
MJ Descriptive Norms		.14	.09	.10
MJ Identity		.22***	.02	.58
Negative Affect		-.01	.01	-.05
Step 2: Interaction Effects	.38			
Identity – Injunctive Norms		.10	.02	.05
Identity – Descriptive Norms		-.01	.15	-.03
Identity – Negative Affect		.01	.01	.02
Marijuana Consequences (NB)		B	SE	$Exp (B)$
Step 1: Main Effects	-			
MJ Injunctive Norms		.08	.07	1.08
MJ Descriptive Norms		.01	.06	1.04
MJ Identity		-.01	.02	.98
Negative Affect		.01**	.01	1.01
MJ Use		.45***	.05	1.57
Step 2: Interaction Effects	-			
Identity – Injunctive Norms		.02*	.01	1.02
Identity – Descriptive Norms		-.02*	.01	.98
Identity – Negative Affect		.01	.01	1.00

Notes. MJ = Marijuana; MJ Injunctive Norms = Typical student injunctive norms; MJ Descriptive Norms = Typical student descriptive norms; OLS = Ordinary Least Squares; NB = Negative Binomial. Exp (B) = Exponentiation of the B coefficient, which is an incidence rate ratio. Significant effects in bold for emphasis.

* $p < .05$

**

$p < .01$

***

$p < .001$.