

Marijuana Use and Depression*

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The primary goal of this study is to examine the association between marijuana use and adult depressive symptomatology. The key independent variables examined are age of marijuana initiation, frequency of current marijuana use, the use of other licit and illicit drugs, and whether marijuana was used to cope with problems. The relationships among these variables are assessed using data from the Young Men and Drugs Survey (n = 1,941), a nationally representative sample of men from the 1944–1954 birth cohort. Results show that early marijuana initiation appears to be weakly associated with increased depression in adulthood. This effect, however, is mediated by educational attainment, employment status, marital status, and other drug use, notably alcohol and tobacco use. Adult frequency of marijuana use is not significantly associated with increased depression in adulthood. Finally, marijuana users who use the drug to cope with problems are more depressed than those who do not use to cope with problems.

Is marijuana use associated with depression? Results from studies on the mental health consequences of marijuana use have differed. Some studies have found little or no association between marijuana use and poor mental health (Carter 1980; Rubin and Comitas 1975; Stefanis, Dornbush, and Fink 1977). Other studies have shown that those who use marijuana are more likely to experience symptoms of poor mental health than those who do not (Dembo et al. 1992; Galaif et

al. 1998; Gove, Geerken, and Hughes 1979; Pape, Hammer, and Vaglum 1994; Pedersen 1990; Rainone et al. 1987; Reilly et al. 1998). This study will attempt to resolve these divergent findings by assessing various aspects of marijuana use. We will examine the effects of age at first marijuana use, current marijuana use, and use of marijuana to cope with problems on depression.

Age of first marijuana use may be an important determinant of later mental health outcomes. Several studies have found that those who initiate marijuana use earlier than their peers are likely to have lower levels of psychological well-being later in life than those who initiate use normatively or not at all (Gutierrez, Molof, and Ungerleider 1994; Jones and Heaven 1998; Kandel, Yamaguchi, and Chen 1992; Mainous et al. 1996; Martin et al. 1993; Tschann et al. 1994). Several explanations have been offered for this association. Some argue that early marijuana use affects adult mental health because it limits positive transitional processes to adulthood, such as educational and occupational attainment, and getting married (Codina et al. 1998; Hartnagel 1996;

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Johnson and Herring 1989; Johnson and Kaplan 1990).

Use of marijuana at an early age is particularly likely to affect educational attainment. Several studies have shown that early marijuana users achieve less in high school (Dembo et al. 1992; Ellickson et al. 1998; Guy, Smith, and Bentler 1994; Newcomb and Bentler 1988; Rainone et al. 1987). Educational attainment is closely linked with adult occupational status, and research has shown that both higher educational attainment and higher occupational status are associated with lower depression (Kessler 1982; Ross and Mirowsky 1989). Early marijuana use may therefore be indirectly associated with adult mental health through educational and occupational attainment. Marital status is another factor that may mediate the relationship between early marijuana use and later mental health outcomes. Studies have shown that marijuana users are less likely to be married than nonusers and being married is associated with good mental health (Bourque et al. 1991; Carter 1980; Kaestner 1997).

Another explanation for a positive association between early marijuana initiation and adult psychological distress is that early marijuana users are more likely to be current marijuana users (Bailey, Flewelling, and Rachal 1992; Hartnagel 1996; Stein et al. 1993). In this regard, it may be that early marijuana use is only indirectly related to adult psychological distress through current marijuana use, assuming that current marijuana use is associated with distress.

An additional factor that is likely to affect the relationship between marijuana use and health outcomes is the use of other drugs. It is well established that marijuana users are more likely to use a variety of other drugs, including both illicit drugs and licit drugs such as alcohol and tobacco (Feigelman et al. 1990; Goode 1969; Kandel et al. 1992). Research has shown that depression and other problems may be worse when drugs such as alcohol and cocaine are used in conjunction with marijuana than when marijuana is used alone (Hammer and Pape 1997; Singer et al. 1995). Therefore, the relationship between marijuana use and psychological distress is affected by the fact that marijuana users tend to use other drugs that have significant negative effects on mental health. This argument implies an indirect

effect of marijuana use on mental health via other drug use.

Early marijuana use may be associated with using marijuana to cope with problems in adulthood. Drug use can be a type of avoidance coping—doing things to take one's mind off of a stressful situation. The notion that drug use is often a response to psychological distress is referred to as the coping hypothesis (Curcione 1990; Crutchfield and Gove 1984; Hansell and White 1991; Johnson and Kaplan 1990; Pedersen 1990; Stein, Newcomb, and Bentler 1987; Tschann et al. 1994). As Mattlin, Wethington, and Kessler (1990) suggest, avoidance coping is usually an ineffective and often detrimental way of dealing with stressors. The implication of this logic is that using marijuana to cope with previously existing stressors may worsen mental health rather than improve it, as users intend. Finally, distressed persons may be more likely than nondistressed people to use marijuana to cope with problems.

METHODS

Data

The data for this study come from the 1985 wave of the Young Men and Drugs Survey (see Ritter 1988 for a more complete discussion of the survey). The sample, which was selected using a multistage stratified random sample of men drawn from the lists of the Selective Service System, is representative of all men in the general U.S. population who were 30 to 40 years old in 1984 and 1985. The data were gathered by face-to-face interviews.

The men in the sample were those who were coming of age during the latter half of the sixties and the first half of the seventies. Marijuana experimentation was high during this period, and for this reason this group is particularly appropriate for study. There is a relatively large number of ever-marijuana-users among this group of men. The Young Men and Drugs Survey used a longitudinal panel design, with interviews taking place in 1974, 1984, and 1985. With the exception of birth year, all of the data used for this study are from 1,941 men who were interviewed in the second wave. Longitudinal analysis of the relationship between marijuana use and depression could not be done because there are no

measures of depression in the first wave of data collection.

Measures

Marijuana use. Marijuana use is measured in three ways. One measure concerns age at marijuana initiation. The mean age of marijuana initiation is approximately 21 years and seven months. Age 16 is one standard deviation below the mean age of first marijuana use (among ever-marijuana-users) in this sample. Approximately 83 percent of those who have ever tried marijuana tried it after age 16. We therefore define anyone in the study who used marijuana at age 16 or before as an early user of marijuana. We define those who have tried marijuana but not until after they were 16 years old as later, or normative, initiators. For purposes of the analyses, we measured age of first marijuana use with two dummy variables: early initiators and later initiators both compared to never users.

The second measure of marijuana use measures current level of use. Current adult marijuana use was measured by the number of times the respondent used marijuana in the thirty days prior to the interview. We use frequency of marijuana use in the last month because marijuana stays in the blood system for up to a month, so if the respondents had used marijuana in the last month it is possible that the residuals of the drug may be still influencing mental health. Respondents who do not use marijuana received a zero for this measure. Anyone who used marijuana more than 30 times in the past month received a score of 31.

The third indicator of marijuana use measures attributed reasons for use. We assess the extent to which current marijuana users indicated that they use marijuana to cope with their problems in the last year. Four survey questions tapped using marijuana to cope in the last year. The first question asked, "did you use marijuana to help you cope with problems?" The second item was, "did you use marijuana to help you get through the day?" The third item was, "did you find smoking marijuana in the morning made it easier to start the day?" Finally, the fourth item was, "do you think you would have found it hard to get through an entire week without smoking some marijuana?" We define subjects who answered affirmatively to any one of these questions as

copers. We compare those who use marijuana to cope with those who did not use marijuana to cope.

Educational attainment. We measure educational attainment using the number of years of education completed by 1985. Respondents with 20 or more years of education received a score of 20.

Employment and marital status. We measure employment status by a single dichotomous variable classified as employed or not employed. Unemployed status includes those without jobs who were looking for work, those without jobs who were not looking for work, students, retired persons, and those physically unable to work. We compare those who were married with those who were unmarried. Unmarried persons include the never married, the separated, the divorced, and the widowed.

Other drug use. We assess the use of drugs other than marijuana using two measures. The first measure is a composite consisting simply of the number of other drugs, both licit and illicit, that the subject used over the last year. The drugs included for this measure are alcohol, tobacco, inhalants, psychedelics, sedatives, stimulants, opiates, and cocaine.

The second measure of other drug use specifically measures the frequency with which six of the above mentioned drugs were used. We do not measure psychedelic use and inhalant use because frequency of use of these drugs in the last year was not available. We assess alcohol use by the respondent's reported average number of days of drinking per week for the last year. Tobacco use was measured by the average number of cigarettes smoked per day. We assessed the use of sedatives, stimulants, opiates, and cocaine using the reported total number of times each of these drugs was used during the last year.

Depression. We measure depressive symptomatology using the Center for Epidemiological Studies Depression index (CES-D). Respondents were asked how often they experienced each of twenty items during the past week. Respondents were asked to respond to items such as, "I felt that I could not shake off the blues even with help from my family or friends" with either "rarely or never," "some of the time," "a lot of the time," or "most of the time." We code "Rarely or never" as 0, "some of the time" as 1, "a lot of the time" as 2, and "most of the time" as 3. For most items on the index, a score of three rep-

resents greater depression, however there are four items where a higher score would represent less depression. We reverse-coded the four items where a higher score indicates less depression. All respondents who completed ten or more of the items in the CES-D received a score on the depression measure. Subjects who completed ten or more of the questions but failed to answer some questions received the average item score for each missed item. Thirty-six subjects did not answer ten or more items and therefore did not receive a score on the depression measure. Cronbach's alpha equals .89 for the index, and none of the items, if removed, would have improved the reliability of the measure.

RESULTS

Descriptive Statistics

Table 1 shows the mean, standard deviation, and range for all variables in the study.¹ We will discuss the three indicators of marijuana use here. The mean number of times marijuana

was used in the previous month was 1.35 times. Most respondents used marijuana less than two times in the last month. Thirty-seven percent of respondents never used marijuana, 8 percent of respondents used marijuana at age 16 or before, and 55 percent of respondents tried marijuana but not until after they were 16. Finally, the results for using marijuana to cope show that 7 percent of the sample use the drug to cope with their problems. Fifty-six percent of respondents have used marijuana but did not use it to cope in the last year.

Regression Results

Table 2 shows the results from a hierarchical regression analysis, with several regression models stepping in intervening or control variables that may affect the relationship between marijuana use and depression. The first model assesses the main effect of early marijuana use on depression. The second and third models assess the indirect effect of early marijuana use on depression through educational attainment, employment status, and marital status. The

TABLE 1. Descriptive Statistics for the Primary Variables of the Study (n = 1,941)

Variable	Mean	SD	Min	Max
<i>Marijuana Use Indicators</i>				
Marijuana use in the last month (frequency; 31 = more than 30)	1.35	5.23	0	31
Early marijuana use (three dummies)				
Never used	.37	.48	0	1
Used 16 or before	.08	.28	0	1
Used after 16	.55	.50	0	1
Using marijuana to cope (three dummies)				
Never used	.37	.48	0	1
Used but not to cope	.56	.50	0	1
Used to cope	.07	.26	0	1
<i>Other Drug Use Indicators</i>				
Number of other drugs used	.85	.95	0	6
Number of cigarettes per day	8.38	12.99	0	40
Average days drink per week	1.15	2.03	0	7
Number of days used stimulants in the last year	.44	5.61	0	200
Number of days used sedatives in the last year	.41	9.18	0	365
Number of days used opiates in the last year	.16	3.22	0	100
Number of days used cocaine in the last year	1.43	13.16	0	365
<i>Educational Attainment</i>	13.88	2.78	2	20
<i>Employment Status</i> (1 = employed)	.94	.24	0	1
<i>Marital Status</i> (1 = married)	.70	.46	0	1
<i>Depression</i>	8.64	7.80	0	51

TABLE 2. Hierarchical Regression Analysis Results of Depression on Age of First Marijuana Use, Educational Attainment, Employment Status, Marital Status, Frequency of Marijuana Use, Other Drug Use, and Using Marijuana to Cope (n=1,905)

Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
	b	β	b	β	b	β	b	β	b	β	b	β	b	β
Early Marijuana Use ^a	2.59*** (.68)	.09	2.37*** (.68)	.08	1.52* (.68)	.05	1.61* (.70)	.06	1.21* (.72)	.04	1.38* (.71)	.05	.99 (.72)	.04
Later Marijuana Use ^a	.81* (.38)	.05	.95** (.38)	.06	.62* (.38)	.04	.65* (.38)	.04	.47 (.39)	.03	.46 (.38)	.03	.33 (.38)	.02
Educational Attainment	—	—	-.41*** (.06)	-.15	-.36*** (.06)	-.13	-.36*** (.06)	-.13	-.33*** (.06)	-.12	-.31*** (.07)	-.11	-.30*** (.07)	-.11
Employment Status ^b	—	—	—	—	-.3.28*** (.75)	-.10	-.3.29*** (.75)	-.10	-.3.22*** (.75)	-.10	-.3.17*** (.75)	-.10	-.3.05*** (.75)	-.09
Marital Status ^c	—	—	—	—	-.2.06*** (.40)	-.12	-.2.06*** (.40)	-.12	-.1.94*** (.40)	-.11	-.2.03*** (.40)	-.12	-.1.93*** (.40)	-.11
Frequency of Marijuana Use in the Last 30 Days	—	—	—	—	—	—	-.02 (.04)	-.01	-.04 (.04)	-.03	-.02 (.04)	-.02	-.11** (.04)	-.07
Number of Other Drugs Used in the Last Year	—	—	—	—	—	—	—	—	.52** (.21)	.06	—	—	—	—
Cocaine Frequency ^d	—	—	—	—	—	—	—	—	—	—	-.01 (.01)	-.02	-.01 (.01)	-.02
Opiate Frequency ^d	—	—	—	—	—	—	—	—	—	—	.09 (.06)	.04	.10* (.06)	.04
Sedative Frequency ^d	—	—	—	—	—	—	—	—	—	—	-.02 (.02)	-.02	-.02 (.02)	-.03
Stimulant Frequency ^d	—	—	—	—	—	—	—	—	—	—	.04 (.03)	.03	.00 (.03)	.02
Alcohol Frequency ^e	—	—	—	—	—	—	—	—	—	—	.19* (.09)	.05	.19* (.09)	.05
Cigarette Frequency ^f	—	—	—	—	—	—	—	—	—	—	.03* (.01)	.05	.03* (.01)	.05
Marijuana Used to Cope ^g	—	—	—	—	—	—	—	—	—	—	—	—	3.33*** (.84)	.11
Constant	7.97		13.59		17.66		17.71		16.92		16.56		16.22	
Adjusted R ²	.01		.03		.06		.06		.06		.06		.07	

* $p < .05$; ** $p < .01$; *** $p < .001$ (one-tailed test)

Note: Numbers in parentheses are standard errors.

^aCompared to never users of marijuana

^bEmployed (1) compared to the unemployed (0). Unemployed includes those not seeking employment, retired persons, those in school, and those physically unable to work.

^cMarried (1) compared to the separated, divorced, single and widowed (0).

^dNumber of days used in the last year.

^eAverage number of days drink per week.

^fAverage number of cigarettes smoked per day.

^gUsers of marijuana for coping (1) compared to those who do not use to cope (0).

fourth model includes current marijuana use to assess the direct effect it has on depression and also to assess the mediating effect it may have on the relationship between early use and depression. The fifth and sixth models include other drug use measures to ascertain their mediating effects on the relationship between current use and depression. The last model controls for the use of marijuana for coping in order to assess the effect this may have on the relationship between current marijuana use and depression.

Model 1 shows that early marijuana users and later users in this sample are slightly more depressed than never users. Models 2 and 3 step in the potential intervening variables educational attainment, employment status, and marital status. Educational attainment was stepped in alone (Model 2) to test the hypothesis that this variable mediates the relationship between early marijuana use and later depression. In fact, although educational attainment is negatively associated with depression ($b = -.41, p < .001$), only 8.7 percent of the effect of early use on depression is explained by the effects of educational attainment on depression. Early and later initiators of marijuana are still likely to be more depressed than never users when controlling for educational attainment. Model 3 adds employment status and marital status to assess their potential mediating effects on the relationship between early marijuana use and depression. These variables have an effect on depression, as the married and the employed are less depressed on average than the unmarried and the nonemployed. Controlling for marital and employment status, in addition to educational attainment, explains 41 percent of the association between early marijuana use and depression. Nevertheless, early initiators and later initiators are still likely to be more depressed than never users, even when controlling for educational attainment, marital status, and employment status.

The fourth model in Table 2 includes current marijuana use to analyze the direct effects of adult marijuana use and also to see if current use mediates the effects of early use on depression. Frequency of marijuana use in the last month is not significantly associated with depression ($b = -.02, p = .61$) and does not change or mediate the association between early marijuana use and depression.

The fifth model presented in Table 2 includes the composite measure of other drug

use (including both licit and illicit drugs) as a possible mediating variable between measures of marijuana use and depression. The number of other drugs used besides marijuana is positively associated with depression ($b = .52, p < .01$). Inclusion of other drug use also reduces the strength of the association between age of first marijuana use and depression. In particular, 25 percent of the remaining effect of using marijuana early is explained when current other drug use is statistically controlled. Early marijuana users are still, however, likely to be more depressed than never users. The effect of initiating marijuana use later than age 16 is diminished to nonsignificance when other drug use is controlled. These findings seem to indicate that other drug use does mediate the effect of marijuana use on depression. The effect of age of marijuana initiation, both early and later as compared to never users, diminishes noticeably when other drug use is statistically controlled. This implies that, while those who initiate marijuana use are likely to be more depressed than never users, the effects may work through the association between trying marijuana and using other drugs.

In an attempt to elaborate the findings shown in Model 5 above, Model 6 includes measurements of the frequency of use of cocaine, opiates, sedatives, stimulants, alcohol, and tobacco separately. The results from this analysis indicate that the effect of other drug use on depression in Model 5 is primarily due to positive associations between alcohol and tobacco use and depression. The associations between alcohol and tobacco use and depression are significant but weak, as indicated by the standardized coefficients. Alcohol and tobacco use are associated with depression, not illicit drug use (other than marijuana).

Finally, the last model presented in Table 2 includes the measure of using marijuana to cope with problems. There is a significant association between using marijuana to cope and depression. Those who used marijuana to cope had an average depression index score 3.33 higher than those who did not use marijuana to cope. Furthermore, the effect of using marijuana early as compared to never using is nonsignificant when the use of marijuana to cope with problems is included in the equation. Also, when using marijuana to cope is controlled, frequency of use of marijuana in the last month becomes significantly associat-

ed with depression in a negative direction ($b = -.12, p < .01$). While there is no significant association between frequency of marijuana use and depression without controlling use for coping, when use for coping is controlled this association is significant but in the opposite direction than theory would predict.

In sum, using marijuana to cope with problems as an adult explains the association between early marijuana use and depression that remains after other key independent variables are controlled. Early users are more likely to use marijuana and also to use marijuana to cope with problems as adults. Those who use marijuana to cope are more depressed than those who do not. Also, using marijuana to cope with problems suppresses the relationship between frequency of adult marijuana use and depression. When use of marijuana to cope with problems is not controlled, no significant association between current frequency of marijuana use and depression is observed. However, when use of marijuana to cope is controlled, the association between frequency of marijuana use and depression becomes negative, which is opposite and contrary to the predicted positive relationship. When marijuana is used to cope with problems this is likely to be associated with increased depression, but when it is not used to cope with problems marijuana use is associated with decreased depression.

DISCUSSION

This study has a number of limitations. First, causal relationships cannot be assessed due to the use of cross-sectional data. Second, only men were sampled; therefore, we do not know if our findings are applicable to women. Third, there may be cohort and period differences in these processes which we cannot examine with our data. Each of these limitations should be addressed in future research. Despite these limitations, our analysis of the association between marijuana use and depression using a nationally representative sample of men provides several important findings.

The effect of marijuana use on mental health appears to be weak and indirect. No evidence from this study shows adult marijuana use is positively related to depression. However, the use of marijuana non-normatively (statistically) early, at age 16 or before, has

an effect on later depression. This effect works through educational attainment, employment, marital status, use of alcohol and tobacco, and the increased likelihood of using marijuana to cope with problems in adulthood. This finding concerning the intervening effects of educational attainment and marriage supports earlier research findings by Johnson and Kaplan (1990).

Overall, these models explain a small amount of the total variation in depression. The final model discussed here explains about 7 percent of the variation in depression scores. Nevertheless, some important conclusions can be drawn from the results. First, marijuana users, and particularly early initiators of marijuana use, do appear to be slightly more depressed than never users. A large portion of this effect is explained by educational attainment, employment status, and marital status. Second, current marijuana use does not appear to have a positive association with depression, unless a person uses it to cope with problems. In fact, the association between frequency of marijuana use and depression becomes negative when marijuana use for coping is controlled. This may be because marijuana is a mild euphoriant, which, when used in the company of trustworthy friends, may actually improve the mental state by being a catalyst for enjoying an opportunity to meet and share with friends. Once the detrimental effects of using marijuana to cope are controlled, the beneficial effects of using marijuana socially are no longer suppressed.

The finding that marijuana users who use to cope are more depressed than others may be explained in the following way. The coping hypothesis suggests that some people use drugs to deal with stress. Therefore, we should expect that those who use to cope have more depression symptoms to begin with. If this is the case, and these people use marijuana to cope, it is apparently not effective since these subjects still exhibit higher levels of depression. This argument supports the notion that drug use as a coping technique (avoidance coping) is not effective and may be detrimental. Results presented by Matlin et al. (1990) and Crutchfield and Gove (1984) suggest this interpretation.

In conclusion, although men who have tried marijuana at some point in their lives appear to be more depressed than never users, the frequency with which one currently uses marijuana

na is not associated with increased psychological distress. Using marijuana to cope with problems is significantly associated with increased distress, however it is unclear whether using marijuana to cope causes increased depression or is simply an indication of depression. While the results of this study reveal the counterintuitive finding that, except under the condition of using to cope, current marijuana use may in fact reduce depression, there may be some negative effects on depression of using marijuana as a young teen. Most of the effect of early use on depression is mediated by decreased educational attainment, lower likelihood of employment and marriage, and increased likelihood of using marijuana to cope as adults. Additionally, people who try marijuana at any age are more likely to currently use a variety of other drugs, and this appears to partially explain why people who have tried marijuana may be more depressed than never users. Of these drugs, alcohol and tobacco use are significantly associated with depression, whereas illicit drugs are not.

NOTES

1. The means for the drug use indicators shown in Table 1 were calculated including those respondents who did not currently use each of these drugs. In parentheses after each of the following drug use measures is the mean frequency of use among only those who *did* use the drug during the specified time period: marijuana frequency in the last month (10.38); cigarettes per day (23.09); average days drink per week (3.49); number of days used stimulants in the last year (22.50); number of days used sedatives in the last year (43.72); number of days used opiates in the last year (30.10); number of days used cocaine in the last year (21.87).

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