Adult Work Commitment, Financial Stability, and Social Environment as Related to Trajectories of Marijuana Use Beginning in Adolescence

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ABSTRACT. Background: The objective of this study is to examine trajectories of marijuana use among African Americans and Puerto Ricans from adolescence to adulthood, with attention paid to work commitment, financial stability, drug use, and violence. Methods: Participants (N = 816) completed in-class questionnaires as students in the East Harlem area of New York City at the first wave and provided follow-up data at 4 additional points in time (mean ages = 14, 19, 24, 29, and 32 years). Among 816 participants, there were 60% females, 52% African American, and 48% Puerto Ricans. Results: The chronic marijuana user trajectory group compared with the none or low, increasing, and/or moderate marijuana user trajectory group was associated with negative aspects of work commitment, financial stability, and the social environment. The chronic marijuana user group was similar to the increasing marijuana user group on work commitment and financial stability. Conclusions: These results suggest that treating marijuana use in late adolescence may reduce difficulty in the assumption of adult roles. Because chronic marijuana users experienced the most adverse effects in each of the domains, they require more intense clinical intervention than moderate marijuana users.

Keywords: Longitudinal study, marijuana use trajectory, work commitment

INTRODUCTION

A growing body of research has linked moderate-to-chronic marijuana use with a number of adverse psychosocial outcomes during an adolescent’s transition into adulthood. These outcomes include lower physical and psychological well-being (1, 2), less success at work (3, 4), and increased difficulty with partner and peer relationships (5, 6). The present research adds to the literature on adult psychosocial outcomes as related to prior marijuana use. This study examines the developmental trajectories of marijuana use from adolescence to adulthood as they relate to work commitment and financial independence when the participants are in their 30s, in the context of an environment characterized by drug use and violence. The longitudinal data set is comprised of urban African American and Puerto Rican youth.

A widely documented finding in the literature is the association of higher levels of marijuana use with lower educational attainment (7). Furthermore, several researchers (5, 6) found that high levels of marijuana use during adolescence predicted higher levels of unemployment and reduced income at age 25. Similarly, Green and Ensminger (4) reported that using marijuana 20 or more times by the age of 17 was negatively associated with employment status at age 32–33. Research carried out by Ringel et al. (3) concluded that marijuana use in late adolescence (i.e., age 18) had a
negative impact on the individual’s annual salary earnings at age 29. Khantzian and Albanese (8) also report that more frequent marijuana use may be associated with the user’s lack of motivation to follow through on occupational goals. Marijuana use has been found to have an adverse effect on the educational achievement of high school students who smoke marijuana (9).

We contribute to the preceding research on marijuana use and work outcomes by focusing on a broad array of variables including work commitment (e.g., work achievement), financial stability (e.g., financial problems), and the social environment. Furthermore, we add to the scant literature on the consequences of different patterns of adolescent marijuana use on later aspects of work commitment among urban African Americans and Puerto Ricans.

An individual’s probability of using marijuana has previously been linked to aspects of the social environment such as peer group substance use behaviors (10–13). Windle and Wiesner (14), following a cohort of 1295 suburban public school students who were predominately white, found that marijuana smokers who were in the “high chronics,” “increasers,” and “experimental users” trajectory groups were more likely to have a higher concentration of friends who used marijuana and other illicit drugs in adulthood than did those who were in the “abstainers” group. One mechanism used to explain these findings can be attributed to the theoretical framework of “homophily,” in which an individual tends to gravitate towards peers who share similar behaviors, beliefs, and attitudes (15, 16). Andrews et al. (16), following a group of late adolescents into early adulthood, reported that the substance use behavior of participants, including marijuana use, correlated with the substance use behaviors of peers. Likewise, Ennett et al. (12) found that lesser social distance from substance users made an individual more likely to be a substance user. Our study extends previous research that has linked earlier peer substance use and the individual’s drug use to a later stage of development, namely, adulthood.

Another aspect of the social environment is the individual’s experience of being victimized. Kilpatrick et al. (17), using a national sample of 3006 females between the ages of 18 and 34, reported that respondents who used drugs at the outset of the study were twice as likely to be physically assaulted within the next 2 years as compared with those who reported no drug use. In contrast, Martino et al. (18) reported that marijuana use was not associated with female victimization, but only male victimization. As a possible mechanism for the outcome of violent victimization, Martino and colleagues suggest that substance users have a higher likelihood of putting themselves in risky and dangerous situations when attempting to purchase or sell illegal drugs. Brady et al. (19), studying a cohort of 302 urban Mexican American and European American adolescents, found that substance use (e.g., marijuana, cigarettes) at age 15 was a significant predictor of violent victimization at age 19. The present research should add further clarification to the association between marijuana use and violence directed toward the individual upon reaching adulthood.

Using earlier ages with this sample, we identified 4 trajectories of marijuana use associated with diverse consequences (20). We hypothesize that (1) marijuana users will be divided into at least 4 trajectory groups that represent (a) chronic users, (b) moderate users, (c) increasing users, and (d) none or low users. Based on the literature cited above about marijuana users, we also hypothesize that (2) the chronic marijuana user trajectory group will be associated with a lesser likelihood of commitment to work and a greater likelihood of financial instability (i.e., low work achievement, incapacitated at work, and financial dependence) when compared with any marijuana user trajectory group with a lower degree of marijuana use; (3) the chronic marijuana user trajectory group will be associated with greater adverse social environment outcomes including violence towards the subject, peer drug associations, and coworker’s illegal drug use, when compared with the none or low user trajectory group.

**METHODS**

**Participants**

T5 questionnaires were completed by 816 participants (52% African Americans, 48% Puerto Ricans). Data on the participants were first collected in 1990 (time 1; T1; N = 1332) when the participants were students attending schools in the East Harlem area of New York City. At T1, the questionnaires were administered in classrooms under the supervision of the study research staff with no teachers present. The mean age of participants at T1 was 14.1 years (standard deviation [SD] = 1.3 years; interquartile range from 13 to 15 years). At time 2 (T2; 1994–1996; N = 1190), the National Opinion Research Center located and interviewed the participants in person or by phone. The mean age of the participants at this wave was 19.2 years (SD = 1.5 years; interquartile range from 18 to 20 years). At time 3 (T3; 2000–2001; N = 662), the Survey Research Center of the University of Michigan collected the data. The mean age of the participants at T3 was 24.4 years (SD = 1.3 years; interquartile range from 23 to 25 years). At time 4 (T4) and time 5 (T5), the data were collected by our research group. At T4 (2004–2006; N = 838), the mean age was 29.2 years (SD = 1.4 years; interquartile range from 28 to 30 years). At T5 (2007–2010; N = 816), the average age of the participants was 32.3 years (SD = 1.3 years; interquartile range from 31 to 34 years).

The New York University School of Medicine’s Institutional Review Board (IRB) approved the study for T4 and T5, and the IRBs of both the Mount Sinai School of Medicine and New York Medical College approved the study’s procedures for data collections in the earlier waves. A Certificate of Confidentiality was obtained from the National Institute on Drug Abuse for T1 to T4 and from the National Cancer Institute at T5. At T1 and T2, passive consent procedures
were obtained from the parents of minors. At each time wave, we obtained informed consent from all of the participants. Additional information regarding the study methodology is available from previous reports (21).

At T5, we attempted to follow up all those who participated at T1. We compared the demographic variables for the 816 adults who participated at both T1 and T5 with the 516 who participated at T1 but not at T5. There were no significant differences between the T5 nonparticipants and the T5 participants in the proportion of African Americans and Puerto Ricans ($\chi^2(1) = 0.01, P = .9$) and their parents’ marital status at T1 ($\chi^2(1) = 0.81, P = .4$). However, the percentage of males among T5 nonparticipants (57%) was significantly higher than the percentage of males who participated at T5 (40%) ($\chi^2(1) = 36.2, P < .001$).

**Measures**

**Demographic variables**

Females and African Americans received a value of 1; males and Puerto Ricans received a value of 2.

**Marijuana use (T1–T4)**

The participants reported their use of marijuana at each wave between T1 and T4. Participants were asked “How often have you ever used marijuana?” at T1 and “How often have you used marijuana in the past 5 years?” at T2 through T4. The answer options ranged from never (0) to once a week or more (4).

**Work commitment (T5)**

Employment was a single item: Did you have a job, either part-time or full-time, at any time during the past year? The answer options were no (0) and yes (1). Work achievement was a 3-item scale ($\alpha = .61$), with sample item “Did you receive good evaluations from your boss?” The answer options ranged from never (0) to often (3). Incapacitated at work was a 2-item scale (inter-item correlation = .47, $P < .001$), with sample item “How many times in the last 6 months were you ‘high,’ drunk or stoned while at school or work on alcohol?” The answer options ranged from none (0) to 31–40 times (5). Skipped work was a 2-item scale (inter-item correlation = .79, $P < .001$), with sample item “How often have you skipped work?” The answer options ranged from never (0) to often (3).

**Financial stability (T5)**

Financial independence was a 3-item scale ($\alpha = .68$), with sample item “Have you been able to establish financial independence?” The answer options were no (0) or yes (1). Financial problems was a 6-item scale ($\alpha = .80$), with sample item “Are you having difficulty paying for utility bills (phone/gas/electricity)?” The answer options ranged from not at all true (0) to very true (4).

**Social environments (T5)**

Coworker’s illegal drug use was a 2-item scale (inter-item correlation = .72, $P < .001$), with sample item “How many of your coworkers use illegal drugs?” The answer options ranged from none (0) to most (3). Violence towards subject was a 5-item scale ($\alpha = .69$), with sample item “How often has someone held a weapon (gun, club or knife) to you?” The answer options ranged from never (0) to 5 or more times (4). Peer drug associations was a 3-item scale ($\alpha = .66$), with sample item “How often have your friends asked you to take illegal drugs?” The answer options ranged from not at all (0) to very often (3).

We then defined indicator variables for work commitment and for environment. Each work commitment and environment indicator was assigned the value 1 if the participant’s scale score was in the highest 16th percentile and 0 otherwise. The indicator variable for financial independence was assigned 1 if the participant answered yes to all 3 items and 0 otherwise.

**Analytic Procedure**

We used Mplus (22) to obtain the trajectories of marijuana use from T1 to T4. Marijuana use at each point in time was treated as a censored normal variable. We applied the full-information maximum-likelihood approach (FIML) for missing data (22). We used the optimal Bayesian information criterion (BIC) to estimate the number of trajectory groups. Each participant was assigned to the trajectory group with the largest Bayesian posterior probability (BPP). The observed trajectories for a group were the averages of marijuana use at each point in time when a participant was assigned to the group with the largest BPP (see Figure 1).

To examine the associations of membership in a trajectory group, we used logistic regression analyses (23) that had the indicators of work commitment, financial stability, and social environment as dependent variables and the BPP of membership in the trajectory groups as the independent variables and gender and ethnicity as control variables. The exclusion of the BPP of the chronic marijuana trajectory as an independent variable made that group the focus of the association analysis. That is, a significant logistic regression coefficient for the BPP of a trajectory group meant that there was a significant difference in the probability of the outcome variable for the group compared with the probability for the chronic marijuana group.

**RESULTS**

We compared the African Americans and Puerto Ricans on each of our dimensions of work commitment, financial stability, and the social environment. Based on the chi-square test, there were no significant differences on these dimensions. In contrast to ethnicity, there were a number of gender differences on the dimensions of work commitment and the social...
environment. Males as compared with females were more likely to be unemployed ($\chi^2(1) = 5.3, P < .05$), incapacitated at work ($\chi^2(1) = 29.4, P < .001$), and have coworkers who used illegal drugs ($\chi^2(1) = 47.8, P < .001$). Also, males, as compared with females, were more likely to be exposed to violence ($\chi^2(1) = 16.6, P < .001$) and associated with peers who encouraged drug use ($\chi^2(1) = 30.7, P < .001$).

The mean and standard deviation (SD) scores of marijuana use at each point in time were 0.2 (0.6), 0.8 (1.4), 1.2 (1.5), and 0.9 (1.5) for T1 to T4, respectively. We computed solutions for 2 through 5 trajectory groups. The BICs and entropy measures for each number of groups were 2 (5849, 0.75), 3 (5717, 0.81), 4 (5653, 0.82), and 5 (5662, 0.75). We chose the 4-trajectory-group model because it had the smallest BIC (see Figure 1). The mean BPP of the participants who were assigned to the groups ranged from 87% to 93%, which indicated a good classification.

As shown in Figure 1, we labeled the 4 marijuana user trajectory groups as follows. The none or low marijuana use trajectory group had an estimated prevalence of 64% and included participants who reported no use of marijuana at each wave. The increasing marijuana use trajectory group included participants who reported no use of marijuana at age 14, using marijuana from more than a few times a year (i.e., on average 1.5 use) to less than monthly at age 19, and at least monthly but less than several times a month (i.e., on average 2.5 use) at age 24 and age 29. This group had an estimated prevalence of 10%. The moderate marijuana user group included participants who reported no use of marijuana at age 14, but using marijuana a few times a year thereafter. This group had an estimated prevalence of 12%. The chronic marijuana user group included participants who reported no use of marijuana at age 14, using marijuana less than several times a month at age 19 (i.e., on average 2.5 use), about once a week or more at age 24, and around several times a month at age 29. This group had an estimated prevalence of 14%.

Table 1 contains the percentages in each trajectory group for the variables in the study.

### Table 1

<table>
<thead>
<tr>
<th>Variable</th>
<th>None or low users (64%, n = 519)</th>
<th>Increasing users (10%, n = 81)</th>
<th>Moderate users (12%, n = 99)</th>
<th>Chronic users (14%, n = 117)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographic variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>53% (n = 276)</td>
<td>54% (n = 44)</td>
<td>48% (n = 48)</td>
<td>49% (n = 57)</td>
</tr>
<tr>
<td>Females</td>
<td>68% (n = 353)</td>
<td>48% (n = 39)</td>
<td>57% (n = 56)</td>
<td>38% (n = 44)</td>
</tr>
<tr>
<td>Work commitment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment</td>
<td>89% (n = 461)</td>
<td>79% (n = 64)</td>
<td>90% (n = 89)</td>
<td>80% (n = 94)</td>
</tr>
<tr>
<td>Work achievement</td>
<td>30% (n = 152)</td>
<td>20% (n = 16)</td>
<td>26% (n = 26)</td>
<td>20% (n = 23)</td>
</tr>
<tr>
<td>Incapacitated at work</td>
<td>0.8% (n = 4)</td>
<td>15% (n = 12)</td>
<td>5% (n = 5)</td>
<td>19% (n = 22)</td>
</tr>
<tr>
<td>Skipped work</td>
<td>16% (n = 82)</td>
<td>20% (n = 16)</td>
<td>23% (n = 23)</td>
<td>13% (n = 15)</td>
</tr>
<tr>
<td>Financial stability</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial independence</td>
<td>58% (n = 303)</td>
<td>46% (n = 37)</td>
<td>57% (n = 56)</td>
<td>36% (n = 42)</td>
</tr>
<tr>
<td>Financial problems</td>
<td>19% (n = 97)</td>
<td>19% (n = 15)</td>
<td>26% (n = 26)</td>
<td>28% (n = 33)</td>
</tr>
<tr>
<td>Social environment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coworker’s illegal drug use</td>
<td>11% (n = 58)</td>
<td>30% (n = 24)</td>
<td>20% (n = 20)</td>
<td>27% (n = 22)</td>
</tr>
<tr>
<td>Violence towards subject</td>
<td>8% (n = 42)</td>
<td>15% (n = 12)</td>
<td>12% (n = 12)</td>
<td>23% (n = 27)</td>
</tr>
<tr>
<td>Peer drug association</td>
<td>6% (n = 31)</td>
<td>14% (n = 11)</td>
<td>11% (n = 11)</td>
<td>32% (n = 37)</td>
</tr>
</tbody>
</table>

**FIGURE 1** Trajectories of marijuana use.
Table 2 presents the adjusted odds ratios (AORs) of each marijuana user trajectory group compared with the chronic user trajectory group for each T5 indicator—work commitment, financial stability, and social environment.

Membership in the trajectory groups was significantly correlated with many of the work commitment and social environment indicators. A higher BPP for the chronic marijuana user trajectory group was associated with a decreased likelihood of employment (AOR = 0.37, P < .01) compared with the BPP of the none or low user group. A higher BPP for the chronic marijuana user trajectory was associated with an increased likelihood of being incapacitated at work (AOR = 27.94, P < .001) compared with the BPP of the none or low user group. A higher BPP for the chronic marijuana user trajectory group was associated with decreased likelihood of being employed (AOR = 0.39, P < .05) compared with the BPP of the moderate user trajectory group. A higher BPP for the chronic marijuana user trajectory group was associated with an increased likelihood of being incapacitated at work compared with the BPP of the moderate user trajectory group (AOR = 3.62, P < .05). A higher BPP for the chronic marijuana user trajectory group was associated with a decreased likelihood of financial independence compared with the BPP of the moderate user trajectory group (AOR = 0.35, P < .01). A higher BPP for the chronic marijuana user trajectory group was associated with an increased likelihood of having peers who asked the subject to use illegal drugs compared with the BPP of the moderate user trajectory group (AOR = 4.04, P < .001).

### DISCUSSION

The present investigation examined the trajectories of marijuana use as related to work commitment, financial stability, and aspects of the social environment. There were 4 trajectories of marijuana use apparent in this sample. Given the close fit of the data with both theoretical reasoning and the reports of study participants, it appeared that the 4 trajectory group approach summarized the marijuana use experiences of these young people over an important period of the life course. Our findings indicated that trajectories of marijuana use were significant predictors of later work commitment, financial stability, and the participants’ reports of the social environment (victimization and peer drug associations), after control on gender and ethnicity.

Individuals in the chronic marijuana user trajectory group compared with those in the none or low user trajectory group and the moderate marijuana user trajectory group were more likely to be unemployed, and incapacitated at work. These findings are consistent with results obtained with this sample at a younger developmental stage and with the conclusion that marijuana use may have a negative impact on work commitment (24).
There are several possible explanations that may account for the relationship of the trajectories of marijuana use with both unemployment and incapacitation at work. One possible mechanism intervening between the use of marijuana and incapacitation at work is psychosocial failure, which includes such dimensions as educational failure and engagement in crime (25). Another mechanism intervening between marijuana use and incapacitation at work, proposed by Ringel et al. (3), involves diminished cognitive functioning, which limits one’s ability to perform work-related tasks. Indeed, there is growing evidence that the continued and chronic use of marijuana may lead to changes in the structure and function of the brain that may interfere with the abilities needed for achievements at work (26). The findings regarding marijuana use and incapacitation at work in the present analysis extend earlier results based on the same sample at an earlier stage of development (24). The results take on added importance as the relationships found in this study were among individuals who were average age 14 and followed into the 30s. The chronic user group compared with the increaser group were similar in terms of impaired work commitment.

A member of the chronic user trajectory group was more likely to be financially dependent than a member of the none or low marijuana user trajectory group, or a member of the moderate user trajectory group. Schulenberg et al. (27) reported that those in the chronic user trajectory group had the lowest proportion reporting financial independence. Ferguson and Horwood (28) maintain that this may be related to the fact that cannabis use increases the chances of adopting an unconventional lifestyle characterized by disengagement from social norms such as completing an education. Lesser education was associated with financial dependence. Indeed, Lynskey and Hall (29) reported that early cannabis use is related to leaving school early. The negative consequences of marijuana use may include difficulty in obtaining work, being financially dependent on others, and experiencing financial problems. Brook et al. (24) studying these participants at an earlier developmental stage have found that earlier marijuana use was associated with an increased likelihood of being fired from a job.

Chronic marijuana user trajectory group membership was associated with a greater likelihood that coworkers used drugs than the none or low user trajectory group. This suggests that an individual’s drug use may have an effect on whom he/she chooses to affiliate with at work. Indeed, individuals may be drawn to other drug users at work because they share similar attitudes, beliefs, and values. Of course, another explanation is that the relationship between the individual’s marijuana use and whom he/she chooses to affiliate with at work is reciprocal in nature.

In accordance with the peer selection framework, those individuals in the chronic marijuana user trajectory group were more likely to associate with peers who used drugs than those in the none or low user trajectory group, than those in the increasing user trajectory group, and than those in the moderate user trajectory groups. Several investigators have noted that individuals who use marijuana are more likely to lead an unconventional life style and select friends who also use marijuana (11, 30). Members of the chronic marijuana user group may be less likely to maintain strong cultural values among family members, which might result in less commitment to work, more financial instability, and a problematic social environment (31).

Those in the chronic marijuana user trajectory group were more likely to experience violence from others than those in the none or low marijuana user trajectory group. This is consistent with other studies (32, 33). Conceivably, marijuana use is associated with impairment of the individual’s judgment and ability to recognize and comprehend cues suggestive of impending violence. Additionally, the chronic user may be more likely to deal with potentially violent groups in order to obtain marijuana (34). Finally, chronic marijuana users may live in neighborhoods where violence is more prevalent.

The results suggest that the potential effects of chronic marijuana use on adult work commitment should not be treated as inconsequential. The findings of this study need to be taken into account with regard to future policies related to medical marijuana use. (35).

Of significance is the fact that there were no statistically significant differences between the chronic user trajectory group and the increasing user trajectory group on the following dimensions: (a) work commitment, (b) financial stability, and (c) aspects of the social environment, including a coworker’s illegal drug use and violence towards the participant. Indeed, as shown in Figure 1, marijuana use at ages 14 and 29 were nearly equal for the increasing user trajectory group and the chronic marijuana user trajectory group. Consequently, treatment programs should be focused not only on the chronic marijuana user trajectory group, but on the increasing user trajectory group as well.

The present study has several limitations. Our data are based on self-reports rather than official records (e.g., medical records or police reports). However, studies have shown that self-report data yield reliable results (36). Another limitation is that our sample did not represent the full range of ethnic diversity existing in the United States, but only included African American and Puerto Rican participants living in a particular geographical urban area. Thus, we are limited in our ability to generalize beyond the present sample. Nevertheless, our findings are consistent with the results of other investigators (24, 27).

Despite these limitations, the study has a number of strengths. First, unlike most research that focuses on only one or two points in time, we assessed marijuana use over a span of 15 years covering important developmental stages from ages 14 to 29. Second, the prospective nature of the data enabled us to go beyond a cross-sectional analysis and to take into consideration the temporal sequencing of
variables. Third, the present study is unique because this study examined marijuana use trajectories as related to important aspects simultaneously, namely, work commitment, financial stability, and the social environment (e.g., peer drug use and victimization). Fourth, the results add to the literature by showing that those in the moderate use trajectory groups were intermediate between the chronic users and none/low use participants. Fifth, this is the first longitudinal study focused on African Americans and Puerto Ricans living in an urban area covering almost 2 decades.

The results have implications for public health and treatment. Given the long-term associations of chronic marijuana use and increasing marijuana use in adolescence and functioning in several important areas of adulthood, chronic marijuana use should be treated as an important public health problem. As regards public health, efforts made to reduce the chronic use of marijuana may go a long way toward increasing work commitment and financial stability in the user. From a clinical perspective, treating marijuana use in late adolescence may serve to reduce the likelihood of becoming a marijuana-using adult who has difficulty in functioning in the world of work and the social environment. Because individuals in the chronic and increasing marijuana user trajectory groups experienced the most adverse effects in each of the domains, interventions are indicated for chronic and increasing marijuana users, in order to decrease the likelihood of long-term morbidity. There were no ethnic differences in adult work commitment, financial stability, and the social environment. Nevertheless, it would be important to make sure that prevention and treatment programs are culturally relevant and linguistically appropriate. This may enhance the acceptability of interventions for African Americans and Puerto Ricans, resulting in an improvement of the interventions efficacy (37).

REFERENCES


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