Assessment and Treatment of Cannabis Dependence

Introduction

Despite being the most commonly used illicit drug in the United States,[1] fairly limited attention has been devoted to empirically studying the nature or treatment of marijuana dependence. Likely misconceptions contributing to the lack of greater research emphasis in this area include the notion that dependence on marijuana does not occur, or - if it does occur - is simply a manifestation of multiple drug dependence, or that tailored approaches for the assessment and treatment of marijuana dependence are unnecessary.[2] The purposes of this chapter are to briefly address these misconceptions, summarize current knowledge concerning estimates of the prevalence of marijuana use and dependence in the U.S. and its correlates, review the findings from our National Institute on Drug Abuse-funded studies of marijuana dependence treatment, and offer a protocol for assessment and clinical intervention with marijuana dependent adults.

Adverse Consequences Reported by Heavy Marijuana Users

A nonclinical New York City study conducted in the mid-1980's focused on 150 daily marijuana users.[3] While most respondents reported that the benefits of use outweighed the negative effects, one half indicated that they wanted to cut back or stop entirely. Impaired memory was reported by two thirds of these individuals, and nearly one half disclosed that they were having difficulty concentrating, were finding that their motivation was low, or were concerned about possible health risks.

Another nonclinical study conducted at about the same time reported findings from 99 persons who were recruited for interviews through local media publicity seeking "heavy" marijuana users.[4] Nearly half of these daily or near-daily users indicated that they experienced reduced levels of energy or motivation, difficulties with concentration or memory, or financial problems. Twenty eight percent had thought of seeking help in stopping use.

A Seattle study conducted in 1984 used local publicity to invite adults who were concerned about their marijuana use to phone for an anonymous interview.[5] Unlike the above two studies, this one specifically targeted concerned smokers. Of the 225 individuals who were interviewed over a two week period, more than 90% were interested in obtaining help to stop use. These respondents reported an average of 4.5 problems related to their marijuana smoking.

In 1987 and 1988, 212 adult chronic marijuana smokers were enrolled in a NIDA-funded marijuana cessation treatment study that compared two forms of group counseling.[2] The participants had been using the drug for an average of 15 years, and reported smoking it an average of 79 of the 90 days preceding enrollment. Adverse consequences listed by at least 50% of these individuals including feeling bad about using (87%), procrastinating (85%), lowered self-esteem (76%), memory impairment (66%), and withdrawal symptoms (50%).

A general population survey of problems associated with alcohol and marijuana use in New Zealand is further suggestive of the prevalence of problematic consequences associated with heavy use.[6] Of those individuals who had smoked marijuana 10 or more times in the preceding 30 days, 65% reported at least one problem associated with its use.

In summary, data from convenience samples of heavy users, a New Zealand general population survey, and a sample of adults seeking assistance in stopping marijuana use converge to suggest the following: a substantial percentage of heavy users express motivation to stop or cut back, and many make numerous unsuccessful attempts to quit; and heavy users commonly report adverse consequences that include impairment in memory and concentration, reduced energy or motivation, procrastination, and health concerns.

Finally, there is evidence that contradicts the belief that marijuana dependence is unlikely to occur in the absence of concurrent dependence on other mood-changing substances. In the two marijuana treatment outcome studies discussed below, only about 20% of applicants reported current abuse of other drugs.[7] While a substantial percentage had abused one or more other drugs at some point in their lives, most were not concurrently abusing (i.e. within the previous 90 days) multiple drugs at the time they sought assistance for marijuana dependence.

Marijuana (flowering tops, leaves, small stems) and hashish (resin exuded by the leaves) are two preparations from the cannabis plant. In this chapter, however, the terms marijuana and cannabis will be used interchangably.

Estimates of the Prevalence of Dependence

In 1994, it is estimated that 8.5 % of the population (17,813,000 people) 12 years of age or older used marijuana at least once, and 4.8% (10,112,000) had used it in the month prior to being interviewed. Just over five million persons (5,139,000) were estimated as having used marijuana one or more times each week.[1]

Data from several studies demonstrate considerable consistency in estimating the prevalence of marijuana dependence. Robins and Regier report findings from the Epidemiology Catchment Area study in which 20,000 individuals from five geographic areas were assessed using a standardized clinical interview schedule.[8] Based on DSM-111 criteria, they found 4.4% of their overall sample qualifying for a lifetime diagnosis of cannabis abuse or dependence.

The National Comorbidity Study, conducted between 1990 and 1992, provided data for the purpose of estimating the percentages of non-institutionalized Americans between the ages of 15 and 54 who had ever used, and had ever become dependent on, alcohol, tobacco, and a number of other drugs.

Utilizing DSM-IIIR criteria, these researchers estimated the lifetime prevalence of cannabis dependence as including 4.2% of the entire sample and 9.1 % of those persons who had ever used cannabis (46.3% of the respondents).

Some years earlier, Weller and Halikas reported data from their longitudinal research

with 97 marijuana smokers who had been using the drug for about a ten year period.[10] Using diagnostic criteria adapted from the field of alcoholism research, the authors estimated that 9% of these ongoing users had become marijuana dependent.

Treatment Outcome Studies

Evaluating A Relapse Prevention Group Intervention. Our first study[7] was designed to test the efficacy of Marlatt & Gordon's relapse prevention model.[11] Focusing on proximal situational determinants of relapse, this model's key tenets include the following: (1) individuals will vary in the extent to which specific high-risk situations create vulnerability to slipping; (2) effectively coping with such vulnerabilities will enhance the individual's self-efficacy, with a consequent reduced likelihood of relapsing; (3) being unable to implement a coping behavior in the face of a high risk situation will decrease self-efficacy, increase the individual's positive expectancies concerning the outcome of engaging in the behavior, and potentially lead to a lapse; and (4) the individual's cognitive and emotional reactions to having lapsed (termed the Abstinence Violation Effect by Marlatt and Gordon) will influence whether a full-blown relapse or a return to behavioral avoidance takes place. Based on these principles, the key components of relapse prevention training have included assisting the client in identifying his/her specific situational risk factors (e.g. high risk situations), assessing the client's coping repertoire in relation to these situations, providing training in coping skills to resist lapses, and teaching cognitive restructuring as a means of countering self-defeating attributions following a lapse.

The sample of 212 subjects, who responded to publicity advertising a counseling program for adults who sought help in stopping marijuana use, were blocked, on sex and randomly assigned to either a relapse prevention (RP) group treatment or a group discussion comparison intervention. Each treatment consisted of 10 two-hour group sessions led by male-female cotherapist teams. The subjects averaged 32 years of age, 95% were white, 85% were employed, and 94% had at least a high school education. On average, they had been using marijuana for 15 years and had used at least once on 81 of the past 90 days.

Outcomes. Although 63% of subjects in both treatments reported abstinence for at least the last two weeks of the treatment period, only 49%, 37%, 22%, 19%, and 14% of the sample remained continuously abstinent at the 1, 3, 6, 9, and 12 month posttreatment follow-ups, respectively. When clinically significant improvement was defined as a 50% reduction in days of marijuana use and no concurrent report of adverse consequences, 31% of the sample was either abstinent or continuously improved throughout the 12-month follow-up. The hypothesis that RP subjects would show superior outcomes in terms of posttreatment marijuana use was not supported.

The results of the first treatment study supported the utility of intervening with a chronic marijuana using population but did not support the hypothesis that the cognitive-behavioral skills training approach was superior to group discussion. One interpretation of the equivalent outcomes was that individuals who were voluntarily seeking to quit marijuana use were capable of doing so with only minimal encouragement and support. Consistent with a growing literature on brief interventions with other addictive behaviors, we reasoned that minimal intervention and advice may promote reduction of marijuana use superior to no treatment, if not equivalent to longer,

more intensive interventions.

Evaluating A Brief Motivational Enhancement Intervention. Thus, the second study, again targeting chronic users who desired help in quitting, used a three-group design and compared a 14 session RP group treatment with a two-session individual assessment and intervention condition (IAI) and a delayed treatment control group. The RIP intervention in the second study was lengthened by one month and four additional group sessions in order to allow more time for group support processes while retaining the coping skill training activities. In addition, an optional supporters group was made available to the significant others of participants in the RP condition. The supporters group was designed to help significant others assist the participant in quitting by using RP principles. RP groups in the second study were also encouraged and assisted in forming ongoing self-help groups that would continue after the formal treatment.

The therapist style utilized in the two-session IAI condition has been called motivational interviewing,[12] and is designed to enhance readiness for change in the ambivalent individual. Inherent in this approach are two key assumptions: (I) acceptance facilitates change, and (2) ambivalence is normal. The goal of motivational interviewing is to develop discrepancy between present behavior and important goals endorsed by the individual in order to motivate change. To accomplish this goal, the therapist employs five general principles of motivational interviewing: 1) express empathy; 2) develop discrepancy; 3) avoid argumentation; 4) roll with resistance; and 5) support self-efficacy. The therapist uses reflective listening to convey empathy regarding the client's ambivalence. With this approach, it is important that the client presents the arguments for change. Arguments with the client are assumed to be counterproductive, and resistance becomes a signal to the therapist to change strategies. "Rolling with resistance" refers to reframing a client's ambivalence, turning the question or problem back to the client, and allowing the client to accept what he or she wants from the interaction. The therapist also works to support self-efficacy, i.e. the client's perception that he or she is capable of making changes in his or her behavior. Strategies employed by the therapist in motivational interviewing include open-ended questions, reflective listening, affirmation of the client, periodic summaries of the pros and cons of change expressed by the client, elicitation of self -motivational statements, recognizing and dealing with resistance, recognizing readiness for change, providing information and advice, and negotiating a plan for change.

During the first session of this brief individual intervention, the therapist used a feedback report generated from data collected during the subject's pretreatment assessment to stimulate discussion and elicit self-motivational statements. The report summarized the individual's frequency of marijuana use, self-report of related problems and concerns, the individual's reasons for wanting to quit, and the specific situations which the individual anticipated would present high risk for slips. Motivational interviewing principles were used to build motivation. If the client decided to initiate change, the focus of the session then shifted to identifying and discussing coping strategies for each anticipated high risk situation. The client was encouraged to complete a written contract that specified the date when use would cease and coping strategies that would be employed when experiencing risk of slipping. During the second session held one month later, the therapist reviewed progress toward abstinence and the effectiveness of the cessation strategies the subject had used during the previous month. If needed, modifications to the cessation plan were negotiated. After this second session, there was no further contact

between the subject and therapist.

Outcomes. There was no evidence of significant differences between the RP and IAI treatment conditions in abstinence rates, days of marijuana use, severity of problems, or number of dependence symptoms at any of the follow-up assessments (4, 7, 13, and 16 months following the initiation of treatment). Both active treatments produced substantial reductions in marijuana use relative to the delayed treatment control condition which also showed some tendency to reduce marijuana use across the four month waiting period. The percentages reporting abstinence for the preceding 90-day period at each follow-up point were 37%, 32%, 26%, and 29% for the 14 session RP intervention and 37%, 36%, 28%, and 28% for the 2-session IAI condition.

While conclusions regarding null findings must be limited, the large sample sizes and substantial differences in intensity of the treatments argue for the equivalent efficacy of the two conditions. The results suggest that minimal interventions may be more cost-effective than extended group counseling efforts for this population.

Summary. Our experience in working with marijuana dependent adults leads us to the following conclusions: (1) When specialized therapeutic support is publicized and perceived by the potential client as sensitive to and tailored for his or her experiences in struggling with marijuana dependence, a substantial number of individuals are likely to request assistance in quitting use of this drug. (2) Both brief individual and extended group interventions are effective in assisting subjects in achieving abstinence. (3) As is commonly found in the treatment of addictive disorders, considerable relapse occurs during the year following treatment completion, thus suggesting the importance of providing continued access to aftercare support during this period.

Defining a Standard of Care for Marijuana Dependence

While the limitations of currently available data necessitate considerable caution in specifying a definitive standard of care for marijuana dependent adults, it is possible to outline a provisional protocol for their assessment and treatment.

Assessing Marijuana Dependence. The DSIVI-IV classification scheme is based on a perspective that views dependence as the repeated, nonmedical use of a substance that harms the user or incites behavior in the user that harms others, and involves psychological and/or physical dependence.[13] Its diagnostic criteria, three or more of which must have occurred within the same 12-month period, include: tolerance; withdrawal; more frequent consumption or consumption of greater quantities than had been intended; a persistent desire or unsuccessful attempts to cut down or control use; a great deal of time devoted to obtaining, using, or recovering from the effects of a substance; use of the substance leads to interference with or giving up of important social, occupational, or recreational activities; or substance use continues despite the individual having a persistent or recurrent physical or psychological problem that has likely been caused or exacerbated by use of the substance.[14]

In seeking precision in the assessment process with marijuana dependence, the clinician is confronted by several obstacles. While the illegality of the drug offers the possibility of defining any use as abuse per se, this criterion is not likely to be clinically meaningful. Measures of chronicity, quantity consumed, or frequency of use, particularly in the extreme, may predict the likelihood of dependence, but not with sufficient certainty to be

used as conclusive diagnostic indicators. Chronic use, even at a daily level, appears to occur without adverse social consequences in some users. To further complicate matters, defining a standard "dose" of marijuana is difficult because of the variable potency of street samples as well as the variable amounts of the drug that are absorbed as a consequence of differences in the methods of inhalation and ingestion.

The absence of objective verifiable physical consequences associated with excessive marijuana use further limits assessment efforts. The user who appears in the emergency room -often a marijuana novice - is likely to be experiencing a transient panic reaction without concurrent physiological damage. Memory impairment and difficulties with concentration are likely to be reversible effects of acute intoxication. Impaired lung functioning might be found in the chronic user, [16] although this indicator is confounded in the individual who concurrently smokes tobacco. At present, there are few conclusive studies supporting the efficacy of medical examination in isolating indicators of excessive use of this drug. Thus, the clinician's assessment must largely rely on selfreport data, perhaps augmented by information acquired from others in the client's network. Fortunately, data from our treatment studies suggests that most marijuana users will give valid reports of their use and adverse consequences experienced, at least when the conditions of reporting are clearly nonjudgmental and unlikely to result in negative sanctions.[7]

While the DSM-IV criteria for substance dependence clearly capture the salience of compulsive use patterns of individuals who may benefit from treatment, our approach to assessment focuses less on diagnosis and more on creating a context that will facilitate the elicitation of concerns and expressions of motivation from the marijuana user, Diagnosis serves important communicative functions, but it does little to inform treatment or motivate change.

Despite experiencing major adverse consequences associated with their marijuana use, some clients will express either opposition to, or considerable ambivalence about, modifying their use. Among those who are open to attempting change, some will question the need for abstinence as the goal. With clients who are largely ambivalent about change and are still contemplating their behavioral choices, a modified version of the brief intervention discussed above may be useful in tipping the scales toward a commitment for change. It may also be perceived by the client who is ready to commit to change as a useful way of beginning this process.

Protocol for Brief Intervention. This intervention includes the following components: (1) an explanation of its purposes and format, (2) an assessment interview, (3) a feedback session, and (4) a follow-up session one month later.

(1) Explanation. The clinician offers the client the opportunity to explore his or her experiences with marijuana use, emphasizing that this will be an objective and nonjudgmental process, and that it may help the client in making decisions about the future. The process is described as involving three sessions, with the first focusing on collecting information, the second on reviewing the data together, and the third permitting a chance to look back on and evaluate any decisions that might have been made over a month's time.

The client may raise questions about the current state of knowledge concerning the effects of marijuana use on health and behavior, and it is important that credible

information be provided. If written materials are used, they need to be selected with consideration of the client's educational level. We have used a well written educational pamphlet published by the Johnson Institute and titled "Marijuana: Current Facts, Figures, and Information."

The toll-free number for ordering this publication is 800-892-0314.

(2) Assessment Interview. The clinician takes a history of the client's marijuana (and other drug) use. Inquiring about the client's experience in various domains of functioning can be a useful guide to assist the client in inventorying the negative (and positive) consequences of his or her marijuana use: interpersonal (effects on relationships), intra-personal (effects on self-esteem and self-concept), impact on cognitive processes (memory, concentration), impact on volition (feelings of being in or out of control concerning use patterns), vocational (effects on work performance or general level of ambition in terms of one's career), scholastic (effects on studying, academic aspirations), health (actual or anticipated benefits or adverse health consequences), economic (impact on the user's financial status), legal (avoiding or being liable for arrests), and spiritual (effects on one's sense of integrity, congruence with personal values).

The clinician expresses interest in exploring both motivations that favor and oppose behavioral change, and also inquires about likely obstacles the client would face if he or she decided to modify their marijuana use behavior. These obstacles might include interference from family members or friends, difficulties in dealing with certain emotional states without being high, visiting specific locations where it would be difficult to abstain, or other aspects of the individual's lifestyle or daily routine. Utilizing the principles and strategies of motivational interviewing noted above, the therapist elicits from the client motivational statements about the future.

Many heavy users in their thirties or older are likely to be conflicted about the substantial changes that have taken place in recent decades pertaining to public attitudes and social policies concerning marijuana. Having initiated marijuana use 15 or more years earlier, at a time when considerable tolerance for marijuana smoking existed in this country, these individuals are now confronted with the drug war's zero tolerance attitudes and policies, they have fewer friends who still get high, they face the risk of urine screening at work or when applying for a new position, and they occupy family roles that they and their spouses may perceive as inconsistent with recreational drug use. In consideration of these factors, the clinician needs to be prepared to listen empathically to the client's feelings about changed attitudes and social policies.

In essence, the inquiries being made in the assessment interview focus on the client's contemplation [7] process, i.e. assisting the client in inventorying and evaluating reasons for quitting and those for continuing use, thus setting a context in which the client may move forward in his or her readiness for change.

(3) Feedback Session. This session should be held within one or two weeks of the initial assessment. Its format should include a systematic review of the information covered in the assessment session, but with the clinician using reflective listening and open-ended questions as a means of eliciting the client's current thoughts and feelings about the behaviors and consequences he or she has described. Periodically, the clinician summarizes the client's feelings regarding marijuana use, both the pros and the cons. If the client expresses motivation to change, the clinician can suggest that the following

30-day period be considered as an experiment, provide a menu of behavior change options, and schedule an appointment one month later to review progress and provide further assistance.

It is important to note, however, that some clients will remain substantially ambivalent about change, even in the face of feedback that documents problems related to marijuana use. Rather than proceed automatically with a prescription for change, the clinician should acknowledge the client's ambivalence and suggest that the client may want to think more about their use of marijuana before making a commitment to change. In this way, the clinician avoids engendering resistance and leaves the door open for scheduling additional appointments to further discuss the pros and cons of marijuana use.

Once he or she expresses clear interest in changing their marijuana use, an issue that is likely to be raised by the client is whether the goal of treatment might be moderation. There are no empirical outcome studies that predict the level of success with a moderation goal. However, it is our impression that permitting consideration of moderation as a potentially viable objective lowers a barrier to participation among some individuals who otherwise would refuse to commit to any change.

If the clinician and client decide to give moderation a try, setting specific objectives that will subsequently be reviewed following a given period of time will facilitate evaluation of its outcome. Contracting with the client that he or she will work toward becoming abstinent in the event that moderation is not attainable provides a back-up plan. In the first author's clinical experience, many marijuana dependent clients who attempt moderation find that it is difficult to maintain, and eventually express the conviction that abstinence is their only remaining choice.

Helping the client prepare to stop might include the following guidelines and advice: look into support groups such as Marijuana Anonymous and Rational Recovery, set a quit date, dispose of all marijuana and associated paraphernalia, disclose to people with whom the client smokes that he or she is quitting and seek their support, consider certain people and places that should be avoided because they present too great a risk, plan ahead for how free time will be spent in the first week of abstinence, and keep a daily log of situations in which strong urges to use occur.

Formalizing the decision to quit through the preparation of a "quit contract" can serve to reinforce the client's motivation. This signed statement identifies the reasons why the individual has decided to quit and lists the strategies that will be used in accomplishing this goal. Thus, the quit contract can remind him or her of the coping strategies that need to be practiced while learning to be a nonuser of marijuana.[18]

A key component of the intervention includes anticipating and planning for future high-risk situations, and debriefing those that have recently been experienced. These strategies are based on the premise that the client is essentially entering a "training" period in which he or she is learning how to live without marijuana. Overcoming dependence involves facing vulnerable situations, practicing responding to them with alternative strategies, and gradually becoming competent and confident in this new lifestyle.

(4) Follow-Up Session. This session, held approximately one month after the feedback session, provides an opportunity to review any efforts the client may have made to

change and to assess his or her goals for the future. The clinician can offer reinforcement to the client for instances in which he or she effectively used strategies to cope with high risk situations, and can assist the client in deriving an understanding of factors that contributed to the slips that occurred and how they might be better dealt with in the future. In the event that the client continues to feel ambivalent about goals, an additional focus on these mixed motivations might be helpful. This session also affords an opportunity to consider the ways in which the client might obtain support in the future, with one option possibly being regular or ad hoc sessions with the clinician.

Aftercare. Periodic "check-ups" with the clinician are likely to enhance the client's sense of support as he or she continues to face relapse vulnerabilities. They provide an opportunity for reinforcing successes, debriefing particularly difficult situations, and brainstorming future coping strategies. They also facilitate a broader consideration of factors in the client's lifestyle that may influence the durability of this behavior change. While there are no empirical data to inform this decision, we recommend that these aftercare sessions be continued for at least one year.

Summary and Conclusions

Chronic marijuana users who find themselves needing support in stopping are likely to be motivated by a combination of factors including feeling badly about being unable to control the amount or frequency of use, procrastination, experiencing negative feedback from a spouse or partner, fearing being an inappropriate role model for children, and concerns about the potential for urine screening on the job. Many users, however, are also likely to express resentment with drugwar policies and changed public attitudes concerning use of this drug.

The motivational enhancement and relapse prevention themes discussed in this chapter can provide the framework for a brief therapeutic intervention that emphasizes assisting the client in resolving ambivalence about change, setting goals, identifying likely sources of vulnerability to relapse, developing cognitive and behavioral coping strategies to deal with those vulnerabilities, harnessing social support, and making lifestyle modifications that will facilitate durable maintenance of the behavior change.

References

1.Substance Abuse and Mental Health Administration, Office of Applied Studies. Preliminary estimates from the 1994 National Household Survey on Drug Abuse. *Advance Data Report No. 10,* September, 1995.

2. Roffman, R.A., Stephens, R.S., Simpson, E.S., & Whitaker, D.L. (1988). Treatment of marijuana dependence: Preliminary results. *Journal of Psychoactive Drugs, 20,* 129-137.

3. Haas A.P., Hendin H. (1987). The meaning of chronic marijuana use among adults: A psychosocial perspective. *Journal of Drug Issues, 17,* 333-348.

4. Rainone, G.A., Deren, S., Kleinman, P.H., Wish, E.D. (1987). Heavy marijuana users not in treatment: The continuing search for the "pure" marijuana user. *Journal of Psychoactive Drugs, 19,* 353-359.

5. Roffman, R.A., & Barnhart, R. (1987). Assessing need for marijuana dependence treatment through an anonymous, telephone interview. *International Journal of the*

Addictions, 22, 639-651.

6. Black, S., & Casswell, S. (1992). User reports of problems associated with alcohol and marijuana. *British Journal of Addiction,* 87, 1275-1280.

7. Stephens, R.S., Roffman, R.A., & Simpson, E.E. (1994). Treating adult marijuana dependence: A test of the relapse prevention model., *Journal of Consulting and Clinical Psychology, 62,* 92-9.9.

8. Robins, L.N., & Regier, D.A. (1991). *Psychiatric disorders in America.* New York: Free Press.

9. Anthony, J.C., Warner, L.A., & Kessler, R.C. (in press). Comparative epidemiology of dependence on tobacco, alcohol, controlled substances, and inhalants: Basic findings from the National Comorbidity Survey. *Clinical and Experimental Psychopharmacology.*

10. Weller, R.A., & Halikas, J.A. (1980). Objective criteria for the diagnosis of marijuana abuse. *Nervous and Mental Diseases,* 168, 98-103.

11. Marlatt, G.A., & Gordon, J.R. (1985). *Relapse prevention: Maintenance strategies in the treatment of addictive behaviors.* New York: Guilford Press.

12. Miller, W.R., & Rollnick, S. (1991). *Motivational interviewing: Preparing People to chancterize addictive behaviors.* New York: Guilford Press.

13. Maxmen, I.S., & Ward, N.G. (1995). *Essential psychopathology and its treatment.* (2d edition). New York: Norton.

14. American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental*
disorders: DSM-IV. (4th edition). Washington, D.C.

15. Roffman, R.A., & George, W.H. (1988). In Donovan, D.M., & Marlatt, G.A., (eds.).*Assessment of addictive behaviors.* New York: Guilford Press, 325-363..

16. Tashkin, D.P., Coulson, A.H., Clark, V.A., et al. (1987). Respiratory symptoms and lung function in habitual heavy smokers of marijuana alone, smokers of marijuana and tobacco,