CAPT Decision Support Tools

Risk and Protective Factors Associated with Youth Marijuana Use

Using Prevention Research to Guide Prevention Practice

SAMHSA's Center for the Application of Prevention Technologies June, 2014

This document was developed under the Substance Abuse and Mental Health Services Administration's Center for the Application of Prevention Technologies contract. Reference #HHSS277200800004C. For training and technical assistance use only.

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Introduction and Purpose

Understanding those factors associated with marijuana abuse helps us know how to assess, plan for, and select interventions designed to address these factors. This document provides a summary of research findings on factors associated with marijuana use among youth. These factors have been organized according to the socio-ecological model, a multi-level framework that allows us to consider the different contexts in which shared risk and protective factors exist.

The four levels of the socio-ecological model include the following:[1,2,3]

- **Individual Level**: Factors specific to the individual, such as age, education, income, health, and psychosocial problems, which may correspond with substance use.
- **Relationship Level**: An individual's closest social circle—family members, peers, teachers, and other close relationships—that contribute to their range of experience and may influence their behavior.
- **Community Level**: The settings in which social relationships occur, such as schools, workplaces, and neighborhoods. These factors can have both negative and positive associations with substance use.
- **Societal Level**: Broad societal factors, such as social and cultural norms. Other significant factors operating at this level include the health, economic, educational, and social policies that contribute to economic and/or social inequalities between populations.

[1] The Centers for Disease Control and Prevention. The social-ecological model: A framework for prevention. Available online: http://www.cdc.gov/violenceprevention/overview/social-ecologicalmodel.html

[2] The World Health Organization. The ecological framework. Available online: http://www.who.int/violenceprevention/approach/ecology/en/

[3] Domains and sub-domains of the socio-ecological model often overlap or are nested within each other. For example, bulling is an individual-level risk factor that falls under the interpersonal behavior sub-domain however, bulling in a school setting could also be considered a community-level risk factor, that falls under the school sub-domain.

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Related tools in this toolkit include:

- *Strategies and Interventions to Prevent Youth Marijuana Use: An At-A-Glance Resource Tool*, which provides a quick overview of prevention strategies and interventions associated with many of the risk and protective factors included in this documents, accompanied by related research studies and key findings.
- *Prevention Programs that Address Youth Marijuana Use*, which presents detailed descriptions of substance abuse prevention strategies and associated interventions that have been evaluated to determine their effects on marijuana outcomes.
- *Preventing Youth Marijuana Use: An Annotated Bibliography*, which includes abstracts for the resources presented below, as well as for resources included in the strategies document.

The Fine Print: Search Methods and Inclusion Criteria

We conducted a thorough search of the academic literature to identify those factors that protect against or increase the risk for marijuana use during adolescence or emerging adulthood. Searches were conducted in PSYCHINFO, PUBMED, AND EBSCO databases for studies published between 2006 and 2013 using keywords informed by the socio-ecological model and including *marijuana* or *marijuana use* paired separately with each of the following search terms or strings: *risk and protective factors, availability, access, community, norms, family, parental, depression, mental health, school, poverty, discrimination, acculturation, immigration status, media, social status,* and *laws* or *policies.*

76 studies met our criteria for inclusion:

- The study was published in a peer-reviewed journal.
- The full text was available.
- Individual studies included clearly articulated methods for establishing associations between specific risk or protective factors and marijuana use/abuse.[4]
- At least one of the main outcomes (dependent variables) assessed was specifically related to marijuana use/abuse. Studies focused on the consequences of marijuana use/abuse were excluded.
- Outcomes were measured during adolescence or young adulthood.

[4] Although some studies demonstrated links between risk or protective factors and multiple substances, we report marijuana outcomes only in this document.

Among the 76 studies meeting inclusion criteria, six were systematic literature reviews or meta-analyses examining risk and protective factors associated with marijuana use/abuse. These studies, and the risk and protective factors examined and found to be associated with marijuana use, are presented at the end of the document; and results of those systematic reviews and meta-analyses are summarized in the accompanying document, *Preventing Youth Marijuana Use: An Annotated Bibliography*. Readers may want to attach more weight to the findings described in these reviews and meta-analyses compared to others in which only one study demonstrated an association between a specific factor and outcome.

Using These Resources to Guide Prevention Practice

Although there are several ways to approach and use these tables, the following are suggested steps or guidelines.

- **Start with a needs assessment.** It's important to examine local quantitative and qualitative data to identify the risk and protective factors that drive youth marijuana use in *your* community, as these factors may differ from those factors that drive use in another community. For example, high school students in your community may have low perceptions of the risks associated with youth marijuana use, while a more salient factor for another community may be easy access to the drug.

- **Once you have identified local risk and protective factors, use the matrix to determine which of those factors are addressed in the literature.** Targeting factors supported by evidence-based research will increase the likelihood that the strategies you select will prevent youth marijuana use in your community. Note that the risk and protective factors in your needs assessment may be labeled differently from what is in the table. The labels used in the matrix reflect the language used in the related articles.

- **Once you have determined that your identified risk or protective factor is addressed in the literature, learn more.** Read the research article(s) included in the matrix, under citation, to explore the population and setting for the study. Assess the degree to which it is similar to, or different from, your focus population and setting. The article will also provide detailed information on the study design, including the instrument and time frame, outcomes measured, key findings, and study limitations. This information will help you assess the strength of the findings and the degree to which they support the risk or protective factor(s) in which you are interested

  In particular, make sure to look at how the authors define key outcomes (e.g., use, heavy use) as definitions may vary across articles. These distinctions are important, and can help you reconcile seemingly conflicting information. For example, Patrick et al. (p.14) identifies higher childhood family socio-economic status as a risk factor for marijuana *use,* while Tu et. al (p.20) identifies poor family economic status as a risk factor for *heavy* marijuana use. These findings may be contradictory, or they may describe very different outcomes.

A Few Cautionary Notes Regarding Use

Please use prudence when interpreting information included in this table for three main reasons.

1. **The findings are limited to the time frame, libraries, and search parameters described above.** Expanding the time frame or examining risk and protective factors associated with other substances may uncover additional or conflicting factors. For example, many studies establishing a link between acculturation and marijuana use were published prior to 2006. Since these publications are outside the established time frame, the prevalence of acculturation as a risk factor would not be represented in this review.

2. **Our review did not focus on the quality or type of research methods employed.** For example, studies using cross-sectional (rather than longitudinal) data and analyses are included, which does not allow us to determine whether the risk or protective factors preceded marijuana use, whether marijuana use preceded the risk or protective factor, or whether the two co-occurred. For more information on the types of methods used, and to determine whether study authors established temporal precedence of risk and protective factors to outcomes, see the companion piece to this document, *Preventing Youth Marijuana Use: An Annotated Bibliography*.

3. **With the exception of systematic literature reviews and meta-analyses, we do not feature studies demonstrating insignificant or negative findings related to the risk or protective factors featured here.** It is possible that for every study demonstrating a positive finding on any given factor, there is a study showing no findings—suggesting that the relationship between the contributing or associated factor and the outcome is inconclusive. For this reason, you may want to consider only those risk or protective factors supported by two or more studies.

4. **Because our search included international studies as well as studies conducted in the U.S., the context surrounding risk and protective factors must be considered.** For example, in Spain, youth who frequented bars were more likely to report marijuana use. The drinking age in Spain is lower than in the U.S. Youth under 21 years of age in the U.S. may not easily access bars. Therefore, the risk of attending bars illegally may present differently for U.S. youth than for Spanish youth, who can attend bars legally.

INDIVIDUAL LEVEL

Risk Factor	Protective Factor	Outcome	Citation Source
EDUCATION			
Poor academic performance	-	Frequent marijuana use (males); heavy marijuana use (females)	Tu, A.W., Ratner, P.A., & Johnson, J.L. (2008). Gender differences in the correlates of **adolescents**' cannabis use. *Substance Use and Misuse, 43*(10), 1438-1463.
Truancy	-	Initiation of marijuana use	Henry, K.L., Thornberry, T.P., & Huizinga, D.H. (2009). A discrete-time survival analysis of the relationship between truancy and the onset of marijuana use. *Journal of Studies on Alcohol and Drugs, 70*(1), 5-15.
MENTAL & BEHAVIORAL HEALTH			
Conduct disorder symptoms at grade 6 (females)	-	Recurrent marijuana use, impairment due to marijuana use at grade 9	Wymbs, B. T., McCarty, C. A., King, K.M., McCauley, E., Vander Stoep, A., Baer, J.S., & Waschbusch, D.A. (2012). Callous-unemotional traits as unique prospective risk factors for substance use in **early adolescent boys and girls**. *Journal of Abnormal Child Psychology, 4*0(7), 1099-1110.
Callous-unemotional traits and conduct disorder symptoms at grade 6 (males)	-	Recurrent marijuana use, impairment due to marijuana use at grade 9	Wymbs, B. T., McCarty, C. A., King, K.M., McCauley, E., Vander Stoep, A., Baer, J.S., & Waschbusch, D.A. (2012). Callous-unemotional traits as unique prospective risk factors for substance use in **early adolescent boys and girls**. *Journal of Abnormal Child Psychology, 40*(7), 1099-1110.

Risk Factor	Protective Factor	Outcome	Citation Source
Self-control problems (acting without thinking or acting without regard to the consequences) at grade 6	-	Marijuana use at grade 11	King, K. M., Fleming, C. B., Monahan, K. C., & Catalano, R. F., (2011). Changes in self-control problems and attention problems during **middle school** predict alcohol, tobacco, and marijuana use during **high school**. *Psychology of Addictive Behaviors, 25*(1), 69-79.
Attention problems at grade 6	-	Marijuana use at grade 11	King, K. M., Fleming, C. B., Monahan, K. C., & Catalano, R. F., (2011). Changes in self-control problems and attention problems during **middle school** predict alcohol, tobacco, and marijuana use during **high school**. *Psychology of Addictive Behaviors, 25*(1), 69-79.
Impulsivity	-	Lifetime marijuana use and 30-day use	Heavyrunner-Rioux, A. R., & Hollist, D. R. (2010). Community, family, and peer influences on alcohol, marijuana, and illicit drug use among a sample of **Native American youth**: An analysis of predictive factors. *Journal of Ethnicity in Substance Abuse,* 9, 260-283.
Antisocial personality disorder	-	Cannabis use	Perkonigg, A., Goodwin, R. D., Fiedler, A., Behrendt, S., Beesdo, K., Lieb, R. & Wittchen, H.U. (2008). The natural course of cannabis use, abuse and dependence during the **first decades of life**. *Addiction, 103*(3), 439–49.
Depression (females)	-	Frequent and heavy cannabis use	Tu, A.W., Ratner, P.A., & Johnson, J.L. (2008). Gender differences in the correlates of **adolescents**' cannabis use. *Substance Use and Misuse, 43*(10), 1438-1463.
High sensation-seeking	-	Marijuana initiation	Pinchevsky, G. M., Arria, A. M., Caldeira, K. M., Garnier-Dykstra, L. M., Vincent, K. B., & O'Grady, K. E. (2012). Marijuana exposure opportunity and initiation during **college**: Parent and peer influences. *Prevention Science, 13*, 43-54.

Risk Factor	Protective Factor	Outcome	Citation Source
Low ability to manage, regulate, and utilize emotions	-	Marijuana use	Claros, E., & Sharma, M. (2012). The relationship between emotional intelligence and abuse of alcohol, marijuana, and tobacco among **college students**. *Journal of Alcohol and Drug Education, 56*(1), 8-37.
-	Ability to have self-control and emotional management	Lower odds of engaging in the harmful use of marijuana	Claros, E., & Sharma, M. (2012). The relationship between emotional intelligence and abuse of alcohol, marijuana, and tobacco among **college students**. *Journal of Alcohol and Drug Education, 56*(1), 8-37.
Having a major depressive episode in the past year (African Americans)	-	Co-occurring alcohol and marijuana disorder	Pacek, L. R., Malcom, R. J., & Martins, S. S. (2012). Race/Ethnicity differences between alcohol, marijuana, and co-occurring alcohol and marijuana use disorders and their association with public health and social problems using a **national sample**. *The American Journal on Addictions,* 21, 435-444.
High generalized anxiety	-	Early age of marijuana initiation	Marmorstein, N. R., White, H. R., Loeber, R., & Stouthamer-Loeber, M. (2011). Anxiety as a predictor of age at first use of substances and progression to substance use problems among **boys**. *Journal of Abnormal Child Psychology, 38*(2), 211-224.
High generalized or social anxiety	-	Rapid development of marijuana problems after initial use	Marmorstein, N. R., White, H. R., Loeber, R., & Stouthamer-Loeber, M. (2011). Anxiety as a predictor of age at first use of substances and progression to substance use problems among **boys**. *Journal of Abnormal Child Psychology, 38*(2), 211-224.

Risk Factor	Protective Factor	Outcome	Citation Source
INTERPERSONAL BEHAVIORS			
Aggressive behavior (males)	-	Use of cannabis or other similar drugs at age 17	Korhonen, T., Huizink, A. C., Dick, D.M., Pulkkinen, L., Rose, R.J., & Kapiro, J. (2008). Role of individual, peer and family factors in the use of cannabis and other illicit drugs: A longitudinal analysis among Finnish **adolescent twins**. *Drug and Alcohol Dependence, 97*(1-2), 33-43.
Aggression	-	Marijuana experimentation, current occasional and current frequent use	Farhat, T., Simons-Morton, B., & Luk, J. W. (2011). Psychosocial correlates of **adolescent** marijuana use: Variations by status of marijuana use. *Addictive Behaviors, 36*(4), 404-407.
-	Refusal assertiveness	Lower use of marijuana	Glaser, B., Shelton, K.H., & van den Bree, M. B. (2010). The moderating role of close friends in the relationship between conduct problems and **adolescent** substance use. *Journal of Adolescent Health, 47*(1), 35-42.
Bullying perpetration (females)	-	Marijuana experimentation	Farhat, T., Simons-Morton, B., & Luk, J. W. (2011). Psychosocial correlates of **adolescent** marijuana use: Variations by status of marijuana use. *Addictive Behaviors, 36*(4), 404-407.
Engaging in antisocial behavior	-	Lifetime use of marijuana	Collins, D., Abadi, M.H., Johnson, K., Shamblen, S., & Thompson, K. (2011). Non-medical use of prescription drugs among **youth in an Appalachian population**: Prevalence, predictors, and implications for prevention. *Journal of Drug Education, 41*(3), 309-326.
-	Self-efficacy (ability to resist marijuana use in a variety of interpersonal and intrapersonal situations)	Frequency of use, abuse, and dependency symptoms	Walker, D. D., Neighbors, C., Rodriguez, L. M., Stephens, R. S., Roffman, R. A. (2011). Social norms and self-efficacy among heavy using **adolescent** marijuana smokers. *Psychology of Addictive Behaviors, 25*(4), 727-732.

Risk Factor	Protective Factor	Outcome	Citation Source
-	Social competencies (urban male adolescents)	Mediates effect of stressors on marijuana use	Fishbein, D., Herman-Stahl, M., Eldreth, D., Paschall, M., Hyde, C., Hubal, R., & ... Ialongo, N. (2006). Mediators of the stress-substance-use relationship in **urban male adolescents**. *Prevention Science,* 7(2), 113-126.
ATTITUDES AND INTENTIONS			
Pro-delinquency attitudes	-	Lifetime marijuana use and 30-day use	Heavyrunner-Rioux, A. R., & Hollist, D. R. (2010). Community, family, and peer influences on alcohol, marijuana, and illicit drug use among a sample of **Native American youth**: An analysis of predictive factors. *Journal of Ethnicity in Substance Abuse, 9*, 260-283.
-	Intention not to use marijuana	Marijuana use	Stephens, P.C., Solboda, Z., Stephens, R., Teasdale, B., Grey, S.F., Hawthorne, R.D., & Williams, J. (2009). Universal school-based substance abuse prevention programs: Modeling targeted mediators and outcomes for **adolescent** cigarette, alcohol and marijuana use. *Drug and Alcohol Dependence, 102*(1-3), 19-29.
Positive attitudes toward marijuana use	-	Marijuana use	Stephens, P.C., Solboda, Z., Stephens, R., Teasdale, B., Grey, S.F., Hawthorne, R.D., & Williams, J. (2009). Universal school-based substance abuse prevention programs: Modeling targeted mediators and outcomes for **adolescent** cigarette, alcohol and marijuana use. *Drug and Alcohol Dependence, 102*(1-3), 19-29.
Positive attitude toward marijuana use	-	Intention to use marijuana	Morrison, D. M., Lohr, M. J., Beadnell, B. A., Gillmore, M. R., Lewis, S., & Gilchrist, L. (2010). **Young mothers**' decisions to use marijuana: A test of an expanded theory of planned behavior. *Psychology & Health, 25*(5), 569587.

Risk Factor	Protective Factor	Outcome	Citation Source
Intention to use marijuana	-	Cannabis initiation	Perez, A., Ariza, C., Sanchez-Martinez, F., & Nebot, M. (2010). Cannabis consumption initiation among **adolescents**: A longitudinal study. *Addiction, 35*(2), 129-134.
Intention to use marijuana	-	Marijuana use	Morrison, D. M., Lohr, M. J., Beadnell, B. A., Gillmore, M. R., Lewis, S., & Gilchrist, L. (2010). **Young mothers**' decisions to use marijuana: A test of an expanded theory of planned behavior. *Psychology & Health, 25*(5), 569587.
Belief that marijuana relaxes and reduces tension	-	Marijuana use frequency and severity	Hayaki J, Hagerty C.E., Herman, D.S., de Dios, M.A., Anderson, B.J., & Stein, M.D. (2010). Expectancies and marijuana use frequency and severity among **young females**. *Addictive Behaviors, 35*(11), 995-1000.
Belief that marijuana use will relieve tension and help relax	-	Marijuana use	de Dios, M. A., Hagerty, C. E., Herman, D. S., Hayaki, J., Anderson, B. J., Budney, A. J., & Stein, M. (2010). General anxiety disorder symptoms, tension reduction, and marijuana use among **young adult females**. *Journal of Women's Health, 19*(9), 1635-1642.
Perception that marijuana is not harmful/somewhat harmful	-	Recent marijuana use	King, K., & Hoffman, A. R. (2012). Sex and grade level differences in marijuana use among **youth**. *Journal of Drug Education, 42*(3), 361-377.
Perception that marijuana is easy to access	-	Marijuana use	King, K., & Hoffman, A. R. (2012). Sex and grade level differences in marijuana use among **youth**. *Journal of Drug Education, 42*(3), 361-377.
Positive attitudes towards drugs	-	Marijuana use	Tonin, S.L., Burrow-Sanchez, J.J., Harrison, R.S., & Kircher, J.C. (2008). The influence of attitudes, acculturation and gender on substance use for **Mexican American middle school students**. *Addictive Behaviors, 33*(7), 494-954.

Risk Factor	Protective Factor	Outcome	Citation Source
Perception of greater availability of marijuana	-	Lifetime use of marijuana	Collins, D., Abadi, M.H., Johnson, K., Shamblen, S., & Thompson, K. (2011). Non-medical use of prescription drugs among **youth in an Appalachian population**: Prevalence, predictors, and implications for prevention. *Journal of Drug Education, 41*(3), 309-326.
-	Having future aspirations (females)	Past 30-day use of marijuana	Dunn, M. S., Kitts, C., Lewis, S., Goodrow, B., & Scherzer, G. D. (2011). Effects of youth assets on **adolescent** alcohol, tobacco, marijuana use, and sexual behavior. *Journal of Alcohol and Drug Education, 55*(3), 23-40.
SPIRITUALITY/RELIGION			
-	Higher religiosity	Alcohol-and marijuana-use frequency	White, H.R., McMorris, B.J., Catalano, R.F., Fleming, C.B., Haggerty, K.P., & Abbot, R.D. (2006). Increases in alcohol and marijuana use during the transition out of **high school into emerging adulthood**: The effects of leaving home, going to college and high school protective factors. *Journal of Studies on Alcohol, 67*(6), 810-822.

Risk Factor	Protective Factor	Outcome	Citation Source
EXTRACURRICULAR ACTIVITIES			
Frequenting bars and not having organized activities in leisure time	-	Cannabis initiation	Perez, A., Ariza, C., Sanchez-Martinez, F., & Nebot, M. (2010). Cannabis consumption initiation among **adolescents**: A longitudinal study. *Addiction, 35*(2), 129-134.
PHYSICAL HEALTH BEHAVIORS			
-	Good sleep habits; increased weekday and total sleep	Likelihood of past month marijuana use	Pasch, K. E., Latimer, L. A., Cance, J. D., Moe, S.G., & Lytle, L. A. (2012). Longitudinal bi-directional relationships between sleep and **youth** substance use. *Journal of youth and adolescence, 41*(9), 1184-1196.
Early onset of cigarette smoking	-	Cannabis or other similar drugs at age 17	Korhonen, T., Huizink, A. C., Dick, D.M., Pulkkinen, L., Rose, R.J., & Kapiro, J. (2008). Role of individual, peer and family factors in the use of cannabis and other illicit drugs: A longitudinal analysis among Finnish **adolescent twins**. *Drug and Alcohol Dependence, 97*(1-2), 33-43.
Early initiation of alcohol use	-	Marijuana use disorder	O'Connell, J. M., Novins, D. K., Beals, J., Whitesell, N. R., Spicer, P., & The AI-SUPERPFP Team (2011). The association between substance use disorders and early and combined use of alcohol and marijuana in two **American Indian** populations. *Journal of Substance Use, 16*(3), 213-229.
Drinking to intoxication	-	Cannabis or other similar drugs at age 17	Korhonen, T., Huizink, A. C., Dick, D.M., Pulkkinen, L., Rose, R.J., & Kapiro, J. (2008). Role of individual, peer and family factors in the use of cannabis and other illicit drugs: A longitudinal analysis among Finnish **adolescent twins**. *Drug and Alcohol Dependence, 97*(1-2), 33-43.

Risk Factor	Protective Factor	Outcome	Citation Source
Tobacco and alcohol use	-	Onset of cannabis use in adolescents	Guxens, M., Nebot, M., & Ariza, C. (2007). Age and sex differences in factors associated with the onset of cannabis use: A cohort study. *Drug and Alcohol Dependence, 88*(2-3), 234-243.
Early alcohol dependence	-	Chronic cannabis use	Perkonigg, A., Goodwin, R. D., Fiedler, A., Behrendt, S., Beesdo, K., Lieb, R. & Wittchen, H.U. (2008). The natural course of cannabis use, abuse and dependence during the **first decades of life**. *Addiction, 103*(3), 439–49.
Frequent alcohol and tobacco use	-	"Heavy" cannabis use	Tu, A.W., Ratner, P.A., & Johnson, J.L. (2008). Gender differences in the correlates of **adolescents**' cannabis use. *Substance Use and Misuse, 43*(10), 1438-1463.
First alcohol and marijuana use prior to entering high school	-	Marijuana use	Griffin, K. W., Bang, H., & Botvin, G. J. (2010). Age of alcohol and marijuana use onset predicts weekly substance use and related psychosocial problems during **young adulthood**. *Journal of Substance Use, 15*(3), 174-183.
Early onset of cannabis use	Increased participation in sports, athletics or exercising	Frequency of marijuana use	Terry-McElrath, Y.M., & O'Malley, P.M. (2011). Substance use and exercise participation among **young adults**: Parallel trajectories in a national cohort-sequential study. *Addiction, 106(*10), 1855-1865.

RELATIONSHIP LEVEL

Risk Factor	Protective Factor	Outcome	Citation Source
PARENT/FAMILY			
Family disruption	-	Marijuana use	Low, N.C., Dugas, E., O'Loughlin, E., Rodriquez, D., Contreras, G., Chaiton, M., & O'Loughlin, J. (2012). Common stressful life events and difficulties are associated with mental health symptoms and substance use in **young adolescents**. *BMC Psychiatry,* 12, 116.
Higher parental education and income	-	Marijuana use	Humensky, J. L. (2010). Are **adolescents** with high socioeconomic status more likely to engage in alcohol and illicit drug use in **early adulthood**? *Substance Abuse Treatment, Prevention, and Policy,* 5, 19.
Higher childhood family socio-economic status	-	Marijuana use in young adulthood	Patrick, M.E., Wightman, P., Schoeni, R.F., & Schulenberg, J.E. (2012). Socioeconomic status and substance use among **young adults**: A comparison across constructs and drugs. *Journal of Studies on Alcohol and Drugs, 73*(5), 772-782.
Parents have ever used marijuana	-	Initiation of marijuana use	Miller, S.M., Siegel, J. T., Hohman, Z., & Crano, W.D. (2013). Factors mediating the association of the recency of parent's marijuana use and their **adolescent** children's subsequent initiation. *Psychology of Addictive Behaviors, 27*(3), 848-853.
-	Father communication (males)	Marijuana use	Luk, J.W., Farhat, T., Iannotti, R.J., & Simons-Morton, B. G. (2010). Parent-child communication and substance use among **adolescents**: Do father and mother communication play a different role for sons and daughters? *Addictive Behaviors, 35*(5), 426-431.

Risk Factor	Protective Factor	Outcome	Citation Source
-	Father's knowledge of adolescent's activities	Marijuana use	Farhat, T., Simons-Morton, B., & Luk, J. W. (2011). Psychosocial correlates of **adolescent** marijuana use: Variations by status of marijuana use. *Addictive Behaviors, 36*(4), 404-407.
-	Parental monitoring	Marijuana use	Dever, B. V., Schulenberg, J. E., Dworkin, J. B., O'Malley, P.M., Kloska, D. D., & Bachman, J. G. (2012). Predicting risk-taking with and without substance use: The effects of parental monitoring, school bonding, and sports participation. *Prevention Science, 13*(6), 605-615.
-	Higher levels of monitoring at the beginning of 5th grade (Latinas)	Marijuana use	Yabiku, S. T., Marsiglia, F. F., Kulis, S., Parsai, M. B., Becerra, D., & del Colle, M. (2010). Parental monitoring and changes in substance use among **Latino/a and Non-Latino/a pre-adolescents** in the southwest. *Substance Use & Misuse, 45*(14), 2524-2550.
-	Youth perceptions of parental monitoring (parents know what they are doing)	Peer influence on marijuana initiation	Tang, Z. & Orwin, R. G. (2009). Marijuana initiation among American **youth** and its risks as dynamic processes: Prospective findings from a national longitudinal study. *Substance Use & Misuse, 44*(2), 195-211.
-	Parental monitoring	Marijuana use	White, H.R., McMorris, B.J., Catalano, R.F., Fleming, C.B., Haggerty, K.P., & Abbot, R.D. (2006). Increases in alcohol and marijuana use during the transition out of **high school** into **emerging adulthood**: The effects of leaving home, going to college and high school protective factors. *Journal of Studies on Alcohol, 67*(6), 810-822.
-	Mother's disapproval of marijuana use	Marijuana use	Musick, K., Seltzer, J.A., & Schwartz, C.R. (2008). Neighborhood norms and substance use among **teens**. *Social Science Research, 37*(1), 138-155.

Risk Factor	Protective Factor	Outcome	Citation Source
-	Living with a married mother	Marijuana use	Musick, K., Seltzer, J.A., & Schwartz, C.R. (2008). Neighborhood norms and substance use among **teens**. *Social Science Research, 37*(1), 138-155.
Low adolescent family involvement (female)	-	Persistent marijuana use	Juon HS, Fothergill KE, Green KM, Doherty EE, & Ensminger ME (2011). Antecedents and consequences of marijuana use trajectories over the life course in an **African American** population. *Drug and Alcohol Dependence, 118*(2-3), 216-223.
Poor family management	-	Lifetime marijuana use	Fagan, A.A., Van Horn, M.L., Hawkins, J.D., & Arthur, M. (2007). Using community and family risk and protective factors for community-based prevention planning. *Journal of Community Psychology, 35*(4), 535-555.
Inconsistent and decreasing patterns of parental monitoring and communication	-	Marijuana use in the past year, and recent marijuana use	Tobler, A. L., & Komro, K. A. (2010). Trajectories of parental monitoring and communication and effects on drug use among **urban young adolescents**. *Journal of Adolescent Health, 46*(6), 560-568.
-	Familial inter-dependency (supportive exchanges between friends, and consultation and sharing with parents)	Marijuana use	Nasim, A., Corona, R., Belgrave, F., Utsey, S.O., & Fallah, N. (2007). Cultural orientation as a protective factor against tobacco and marijuana smoking for **African American young women**. *Journal of Youth & Adolescence, 36*(4), 503-516.
Paternal incarceration	-	Increased frequency of marijuana use	Roettger, M. E., Swisher, R.R., Kuhl, D. C., & Chavez, J. (2011). Paternal incarceration and trajectories of marijuana and other illegal drug use from **adolescence into young adulthood**: Evidence from longitudinal panels of males and females in the United States. *Addiction, 106*(1), 121-132.

Risk Factor	Protective Factor	Outcome	Citation Source
Being raised without the presence of a biological father	-	Marijuana use	Mandara, J., Rogers, S. Y., & Zinbarg, R. E. (2011). The effects of family structure on **African American adolescents**' marijuana use. *Journal of Marriage and Family, 73*(3), 557-569.
-	Being raised with both biological parents (males)	Marijuana use throughout adolescence	Mandara, J., Rogers, S. Y., & Zinbarg, R. E. (2011). The effects of family structure on **African American adolescents'** marijuana use. *Journal of Marriage and Family, 73*(3), 557-569.
Father's weekly "binge drinking"	-	Cannabis at age 17	Korhonen, T., Huizink, A. C., Dick, D.M., Pulkkinen, L., Rose, R.J., & Kapiro, J. (2008). Role of individual, peer and family factors in the use of cannabis and other illicit drugs: A longitudinal analysis among Finnish **adolescent twins**. *Drug and Alcohol Dependence, 97*(1-2), 33-43.
Having divorced or separated parents	-	Cannabis use	Swift, W., Coffey, C., Carlin, J.B., Degenhardt, L., & Patton, G.C. (2008). **Adolescent** cannabis users at 24 years: Trajectories to regular weekly use and dependence in young adulthood. *Addiction 103*(8), 1361-1370.
Having a parent who smokes cigarettes	-	Cannabis use	Swift, W., Coffey, C., Carlin, J.B., Degenhardt, L., & Patton, G.C. (2008). **Adolescent** cannabis users at 24 years: Trajectories to regular weekly use and dependence in young adulthood. *Addiction 103*(8), 1361-1370.
-	Parent-child communication in 9th grade (males)	Marijuana consumption in 11th grade (males)	Lac, A., Unger, J. B., Basanez, T., Ritt-Olson, A., Soto, D. W., & Baezconde-Garbanati, L. (2011). Marijuana use among **Latino adolescents**: Gender differences in protective familial factors. *Substance Use & Misuse, 46*, 644-655.

Risk Factor	Protective Factor	Outcome	Citation Source
-	Family cohesion in 9th grade	Marijuana consumption in 11th grade	Lac, A., Unger, J. B., Basanez, T., Ritt-Olson, A., Soto, D. W., & Baezconde-Garbanati, L. (2011). Marijuana use among **Latino adolescents**: Gender differences in protective familial factors. *Substance Use & Misuse, 46*, 644-655.
Low levels of parental monitoring during the last year of high school	-	Marijuana exposure opportunity	Pinchevsky, G. M., Arria, A. M., Caldeira, K. M., Garnier-Dykstra, L. M., Vincent, K. B., & O'Grady, K. E. (2012). Marijuana exposure opportunity and initiation during **college**: Parent and peer influences. *Prevention Science, 13*, 43-54.
-	High levels of parental monitoring	Marijuana exposure opportunity	Pinchevsky, G. M., Arria, A. M., Caldeira, K. M., Garnier-Dykstra, L. M., Vincent, K. B., & O'Grady, K. E. (2012). Marijuana exposure opportunity and initiation during **college**: Parent and peer influences. *Prevention Science,* 13, 43-54.
Low parental attachment	-	Lifetime marijuana use	Heavyrunner-Rioux, A. R., & Hollist, D. R. (2010). Community, family, and peer influences on alcohol, marijuana, and illicit drug use among a sample of **Native American youth**: An analysis of predictive factors. *Journal of Ethnicity in Substance Abuse,* 9, 260-283.
-	Parental support (females)	Past 30-day use of marijuana	Dunn, M. S., Kitts, C., Lewis, S., Goodrow, B., & Scherzer, G. D. (2011). Effects of youth assets on **adolescent** alcohol, tobacco, marijuana use, and sexual behavior. *Journal of Alcohol and Drug Education, 55*(3), 23-40.
Foster care history and homelessness	-	Marijuana use	Thompson, R. G., & Hasin, D. S. (2011). Cigarette, marijuana, and alcohol use and prior drug treatment among newly homeless **young adults** in New York City: Relationship to a history of foster care. *Drug and Alcohol Dependence, 117*(1), 66-69.

Risk Factor	Protective Factor	Outcome	Citation Source
Poor family economic status	-	"Heavy" cannabis use for adolescents	Tu, A.W., Ratner, P.A., & Johnson, J.L. (2008). Gender differences in the correlates of **adolescents**' cannabis use. *Substance Use & Misuse, 43*(10), 1438-1463.
Parents who allow youth to set their own curfew		Increase in marijuana use during adolescence	Vaske, J. (2013). Interaction of the **TaqIA polymorphism** and poor parental socialization on changes in **adolescent** marijuana use. *Substance Use & Misuse, 48*(3), 258-264.
PEER INTERACTION			
Having friends who use marijuana	-	Lifetime use of marijuana	Collins, D., Abadi, M.H., Johnson, K., Shamblen, S., & Thompson, K. (2011). Non-medical use of prescription drugs among **youth in an Appalachian population**: Prevalence, predictors, and implications for prevention. *Journal of Drug Education, 41*(3), 309-326.
-	Having fewer friends who use marijuana	Frequency of alcohol use, heavy episodic drinking, and marijuana use	White, H.R., McMorris, B.J., Catalano, R.F., Fleming, C.B., Haggerty, K.P., & Abbot, R.D. (2006). Increases in alcohol and marijuana use during the **transition out of high school into emerging adulthood**: The effects of leaving home, going to college and high school protective factors. *Journal of Studies on Alcohol, 67*(6), 810-822.
Close friends' marijuana use	-	Frequency of use, abuse, and dependency symptoms	Walker, D. D., Neighbors, C., Rodriguez, L. M., Stephens, R. S., Roffman, R. A. (2011). Social norms and self-efficacy among **heavy using adolescent marijuana smokers**. *Psychology of Addictive Behaviors, 25*(4), 727-732.
Homeless youth who meet other youth through homeless settings	-	Frequency of marijuana use	Wenzel, S.L., Tucker, J. S., Golinelli, D., Green, H.D., & Zhou, A. (2010). Personal network correlates of alcohol, cigarette, and marijuana use among **homeless youth**. *Drug and Alcohol Dependence, 112*(1-2), 140-149).

Risk Factor	Protective Factor	Outcome	Citation Source
Affiliation with deviant peers	-	Marijuana use in 11th and 12th grades	Hampson, S.E., Andrews, J.A., & Barckley, M. (2008). Childhood predictors of **adolescent** marijuana use: Early sensation-seeking, deviant peer affiliation, and social images. *Addictive Behaviors, 33*(9) 1140-1147.
Cannabis using friends (females)	-	Cannabis initiation	Perez, A., Ariza, C., Sanchez-Martinez, F., & Nebot, M. (2010). Cannabis consumption initiation among **adolescents**: A longitudinal study. *Addiction, 35*(2), 129-134.
-	Parents and peers disapprove of marijuana use	Marijuana use	King, K., & Hoffman, A. R. (2012). Sex and grade level differences in marijuana use among **youth**. *Journal of Drug Education, 42*(3), 361-377.
Drug-using peers	-	Cannabis use and initiation	Perkonigg, A., Goodwin, R. D., Fiedler, A., Behrendt, S., Beesdo, K., Lieb, R. & Wittchen, H.U. (2008). The natural course of cannabis use, abuse and dependence during **the first decades of life**. *Addiction, 103*(3), 439–49.
Having more than five friends who smoke cigarettes	-	Cannabis or other similar drugs at age 17	Korhonen, T., Huizink, A. C., Dick, D.M., Pulkkinen, L., Rose, R.J., & Kapiro, J. (2008). Role of individual, peer and family factors in the use of cannabis and other illicit drugs: A longitudinal analysis among **Finnish adolescent twins**. *Drug and Alcohol Dependence, 97*(1-2), 33-43.
Having acquaintances who had experimented with cannabis or other drugs	-	Cannabis or other similar drugs at age 17	Korhonen, T., Huizink, A. C., Dick, D.M., Pulkkinen, L., Rose, R.J., & Kapiro, J. (2008). Role of individual, peer and family factors in the use of cannabis and other illicit drugs: A longitudinal analysis among **Finnish adolescent twins**. *Drug and Alcohol Dependence, 97*(1-2), 33-43.

Risk Factor	Protective Factor	Outcome	Citation Source
Having friends who are deviant (definition includes substance using behavior)	-	Cannabis, alcohol, and cigarette use	Mrug, S., Gaines, J., Su, W., & Windle, M. (2010). School-level substance use: Effects on early **adolescents**' alcohol, tobacco, and marijuana use. *Journal of Studies on Alcohol and Drugs, 71*(4), 480-495.
Peer use of marijuana	-	Marijuana use	Ali, M.M., Amialchuk, A., & Dwyer, D. S. (2011). The social contagion effect of marijuana use among **adolescents**. *PLoS One, 6*(1), e16183.
Normative beliefs about peer use of marijuana	-	Marijuana use	Stephens, P.C., Solboda, Z., Stephens, R., Teasdale, B., Grey, S.F., Hawthorne, R.D., & Williams, J. (2009). Universal school-based substance abuse prevention programs: Modeling targeted mediators and outcomes for **adolescent** cigarette, alcohol and marijuana use. *Drug and Alcohol Dependence, 102*(1-3), 19-29.
Peer marijuana use	-	Marijuana initiation	Pinchevsky, G. M., Arria, A. M., Caldeira, K. M., Garnier-Dykstra, L. M., Vincent, K. B., & O'Grady, K. E. (2012). Marijuana exposure opportunity and initiation **during college**: Parent and peer influences. *Prevention Science,* 13, 43-54.
-	Perception that friends "do what is right"	Past 30-day use of marijuana	Dunn, M. S., Kitts, C., Lewis, S., Goodrow, B., & Scherzer, G. D. (2011). Effects of youth assets on **adolescent** alcohol, tobacco, marijuana use, and sexual behavior. *Journal of Alcohol and Drug Education, 55*(3), 23-40.
Having delinquent peers	-	Lifetime marijuana use and marijuana 30-day use	Heavyrunner-Rioux, A. R., & Hollist, D. R. (2010). Community, family, and peer influences on alcohol, marijuana, and illicit drug use among a sample of **Native American youth**: An analysis of predictive factors. *Journal of Ethnicity in Substance Abuse,* 9, 260-283.

Risk Factor	Protective Factor	Outcome	Citation Source
-	Having a friend with an authoritative mother (regardless of own mother's parenting style)	Marijuana use	Shakya, H. B., Christakis, N. A., & Fowler, J. H. (2012). Parental influence on substance use in **adolescent** social networks. *Archives of Pediatric Adolescent Medicine, 166*(12), 1132-1139.
Popularity (self-rated and peer-nominated)	-	Marijuana use	Tucker, J. S., Green, H.D. Jr., Zhou, A. J., Miles, J. N., Shih, R. A., D'Amico, E. J. (2011). Substance use among **middle school students**: Associations with self-rated and peer-nominated popularity. *Journal of Adolescence, 34*(3), 513-519.
Popularity (self-rated)	-	Past month heavy drinking and marijuana use	Tucker, J. S., Green, H.D. Jr., Zhou, A. J., Miles, J. N., Shih, R. A., D'Amico, E. J. (2011). Substance use among **middle school students**: Associations with self-rated and peer-nominated popularity. *Journal of Adolescence, 34*(3), 513-519.
Perceived use of marijuana among friends	-	Marijuana use	Pejnovic, F.I., Kuzman, M., Pavic, S.I., & Kern, J. (2011). Impact of environmental factors on marijuana use in **11 European countries**. *Croatian Medical Journal, 52*(4), 446-457.
High school competitive sports/baseball player or weight lifter (males)	-	Marijuana use	Denham, B. E. (2011). Alcohol and marijuana use among **American high school seniors**: Empirical associations with competitive sports participation. *Sociology of Sport Journal, 28*, 362-379.
Competitive athlete (females)	-	Marijuana use	Denham, B. E. (2011). Alcohol and marijuana use among **American high school seniors**: Empirical associations with competitive sports participation. *Sociology of Sport Journal, 28*, 362-379.

Risk Factor	Protective Factor	Outcome	Citation Source
Social proximity to substance users	-	Marijuana use	Ennett, S. T., Bauman, K. E., Hussong, A., Faris, R., Foshee, V. A., Cai, L., & DuRant, R. H. (2006). The peer context of **adolescent** substance use: Findings from social network analysis. *Journal Of Research On Adolescence*, 16(2), 159-186.
-	Adolescents' social embeddedness	Marijuana use	Ennett, S. T., Bauman, K. E., Hussong, A., Faris, R., Foshee, V. A., Cai, L., & DuRant, R. H. (2006). The peer context of **adolescent** substance use: Findings from social network analysis. *Journal Of Research On Adolescence*, 16(2), 159-186.

COMMUNITY LEVEL

Risk Factor	Protective Factor	Outcome	Citation Source
NEIGHBORHOOD			
Neighborhoods with an increasing presence of abandoned structures over time	-	Marijuana use	Furr-Holden, C. D. M., Lee, M. H., Milam, A. J., Johnson, R. M., Lee, K-S, & Ialongo, N. S. (2011). The growth of neighborhood disorder and marijuana use **among urban adolescents**: A case for policy and environmental interventions. *Journal of Studies on Alcohol and Drugs, 72*(3), 371-379.
Availability of marijuana and/or opportunities to use	-	Tobacco, alcohol, and marijuana use	Fagan, A.A., Van Horn, M.L., Hawkins, J.D., & Arthur, M. (2007). Using community and family risk and protective factors for community-based prevention planning. *Journal of Community Psychology, 35*(4), 535-555.
Community norms favorable to substance use	-	Frequency of alcohol, cigarette, and marijuana use in the past month and binge drinking in the past 2 weeks	Van Horn, M.L., Hawkins, J.D., Arthur, M.W., & Catalano, R.F. (2007). Assessing community effects on **adolescent** substance use and delinquency. *Journal of Community Psychology, 35*(8), 924-946.
Community law enforcement permissive of substance use	-	Frequency of alcohol, cigarette, and marijuana use in the past month and binge drinking in the past 2 weeks	Van Horn, M.L., Hawkins, J.D., Arthur, M.W., & Catalano, R.F. (2007). Assessing community effects on **adolescent** substance use and delinquency. *Journal of Community Psychology, 35*(8), 924-946.
Poor neighborhood safety as indicated by the presence of crime and drug sales	-	Marijuana use	Nalls, A.M., Mullis, R.L., & Mullis, A.K. (2009). **American Indian youths**' perceptions of their environment and their reports of depressive symptoms and alcohol/marijuana use. *Adolescence, 44*(176), 965-978.

Risk Factor	Protective Factor	Outcome	Citation Source
Neighborhood poverty	-	Lifetime marijuana use and marijuana 30-day use	Heavyrunner-Rioux, A. R., & Hollist, D. R. (2010). Community, family, and peer influences on alcohol, marijuana, and illicit drug use among a sample of **Native American youth**: An analysis of predictive factors. *Journal of Ethnicity in Substance Abuse, 9*, 260-283.
Residential mobility	-	Lifetime marijuana use	Heavyrunner-Rioux, A. R., & Hollist, D. R. (2010). Community, family, and peer influences on alcohol, marijuana, and illicit drug use among a sample of **Native American youth**: An analysis of predictive factors. *Journal of Ethnicity in Substance Abuse, 9*, 260-283.
-	Neighborhood cohesion and intergenerational networks (rural)	Marijuana use behavior	Clark, T. T., Nguyen, A. B., & Belgrave, F. Z. (2011). Risk and protective factors for alcohol and marijuana use among **African-American rural and urban adolescents**. *Journal of Child & Adolescent Substance Abuse, 20*, 205-220.
High rates of crime and marijuana using adults (rural)	-	Marijuana use behavior	Clark, T. T., Nguyen, A. B., & Belgrave, F. Z. (2011). Risk and protective factors for alcohol and marijuana use among **African-American rural and urban adolescents**. *Journal of Child & Adolescent Substance Abuse, 20*, 205-220.
Experiencing a natural disaster, e.g., hurricane	-	Excessive use marijuana	Temple, J. R., van den Berg, P., Thomas, J. F., Northcutt, J., Thomas, C., & Freeman, D. H. Jr. (2011). **Teen** dating violence and substance use following a natural disaster: Does evacuation status matter*? American Journal of Disaster Medicine, 6*(4), 201206.
High residential instability (metropolitan areas)	-	Steep increase (rate of change) in marijuana use	Martino S.C., Ellickson P.L., & McCaffrey, D.F. (2008). Developmental trajectories of substance use from **early to late adolescence**: A comparison of rural and urban youth. *Journal of Studies on Alcohol and Drugs, 69*(3), 430-440.

Risk Factor	Protective Factor	Outcome	Citation Source
Greater availability of marijuana (medium and large towns)	-	Steep increase (rate of change) in marijuana use	Martino S.C., Ellickson P.L., & McCaffrey, D.F. (2008). Developmental trajectories of substance use from **early to late adolescence**: A comparison of rural and urban youth. *Journal of Studies on Alcohol and Drugs, 69*(3), 430-440.
SCHOOLS			
Schools with high incidence rates of students attending class "high" on cannabis *(Switzerland)*	-	Cannabis use	Kuntsche, E., & Jordon, M.D. (2006). **Adolescent** alcohol and cannabis use in relation to peer and school factors: Results of a multilevel analysis. *Drug and Alcohol Dependence, 84*(2), 167-174.
Middle schools with lower levels of school commitment	-	Past 30-day marijuana use	Tonin, S.L., Burrow-Sanchez, J.J., Harrison, R.S., & Kircher, J.C. (2008). The influence of attitudes, acculturation and gender on substance use for **Mexican American middle school students**. *Addictive Behaviors, 33*(7), 494-954.
-	Middle schools that perform better than expected on indicators of academic performance and truancy or attendance	Marijuana use	Tobler, A. L., Komro, K. A., Dabroski, A., Aveyard, P., & Markham, W. A. (2011). Preventing the link between SES and high-risk behaviors: "Value added" education, drug use and delinquency in **high-risk urban schools**. *Prevention Science, 12*(2), 211-212.
School disrepair (alternative high school)	-	Marijuana use	Grana, R. A., Black, D., Sun, P., Rohrbach, L. A., Gunning, M., & Sussman, S. (2010). School disrepair and substance use among **regular and alternative high school students**. *Journal Of School Health, 80*(8), 387-393.

SOCIETY LEVEL

Risk Factor	Protective Factor	Outcome	Citation Source
BIRTH COHORTS			
Adolescents who mature in birth cohorts with low disapproval of marijuana use	-	Marijuana use during teenage years	Keyes, K. M., Shculenberg, J. E., O'Malley P. M., Johnston, L. D., Bachman, J. G., Li, G. & Hasin, D. (2011). The social norms of birth cohorts and **adolescent** marijuana use in the United States, 1976-2007. *Addiction, 106*, 1790-1800.
GENDER			
Male gender	-	Marijuana use and abuse problems	Odden, H. L. (2012). Alcohol, tobacco, marijuana and hallucinogen use in **Samoan adolescents**. *Drug and Alcohol Review, 31*, 47-55.
MEDIA			
Increased music exposure (popular media)	-	Marijuana use	Primack, B. A., Kraemer, K. L., Fine, M. J., & Dalton, M. A. (2009). Media exposure and marijuana and alcohol use among **adolescents**. *Substance Use & Misuse, 44*(5), 722-739.

Risk Factor	Protective Factor	Outcome	Citation Source
SOCIAL STATUS			
-	Higher subjective social status	Marijuana use	Finch, K. A., Ramo, D. E., Delucchi, K. L., Liu, H., & Prochaska, J. J. (2013). Subjective social status and substance use severity in a **young adult** sample. *Psychology Of Addictive Behaviors*, *27*(3), 901-908.
ACCULTURATION			
-	Traditional religious beliefs and practices	Marijuana use	Nasim, A., Corona, R., Belgrave, F., Utsey, S.O., & Fallah, N. (2007). Cultural orientation as a protective factor against tobacco and marijuana smoking for **African American young women**. *Journal of Youth & Adolescence, 36*(4), 503-516.
Parent-child discrepancy in acculturation (Hispanic adolescents)	-	Marijuana use	Unger, J. B., Ritt-Olson, A., Soto, D. W., & Baezconde-Garbanati, L. (2009). Parent-child acculturation discrepancies as a risk factor for substance use among **Hispanic adolescents** in Southern California. *Journal Of Immigrant & Minority Health, 11*(3), 149-157.
Second-generation immigrant status	-	Marijuana use	Peña, J., Wyman, P., Brown, C., Matthieu, M., Olivares, T., Hartel, D., & Zayas, L. (2008). Immigration generation status and its association with suicide attempts, substance use, and depressive symptoms among **Latino adolescents** in the USA. *Prevention Science: The Official Journal Of The Society For Prevention Research, 9*(4), 299-310.

Literature Reviews and Meta-Analyses

Risk Factor	Protective Factor	Outcome	Citation Source
High sensation seeking and low harm avoidance temperament (middle school) [INDIVIDUAL LEVEL]	-	High frequency of marijuana use in high school	Creemers, H.E., Verhulst, F.C., & Huizink, A.C. (2009). Temperamental risk factors for **adolescent** cannabis use: A systematic review of prospective general population studies. *Substance Use and Misuse, 44*(13), 1833-1854.
High sensation seeking and low harm avoidance temperament (high school) [INDIVIDUAL LEVEL]	-	Cannabis initiation and future disorder	Creemers, H.E., Verhulst, F.C., & Huizink, A.C. (2009). Temperamental risk factors for **adolescent** cannabis use: A systematic review of prospective general population studies. *Substance Use and Misuse, 44*(13), 1833-1854.
Positive attitudes toward substance use INDIVIDUAL LEVEL: ATTITUDES AND INTENTIONS	-	Marijuana use	Derzon, J.H. (2007). Using correlational evidence to select **youth** for prevention programming. *Journal of Primary Prevention, 28*(5), 421-447.
RELATIONSHIP LEVEL: PARENT/FAMILY	Youth perceptions of parental monitoring (parents know child's activities, friends, and whereabouts)	Marijuana use	Lac, A., & Crano, W.D. (2009). Monitoring matters: Meta-analytic review reveals the reliable linkage of parental monitoring with **adolescent** marijuana use. *Perspectives on Psychological Science, 4*(6), 578-586.

Risk Factor	Protective Factor	Outcome	Citation Source
Having cannabis-using friends RELATIONSHIP LEVEL: PEER INTERACTION	-	Lifetime and regular cannabis use	Creemers, H.E., Dijkstra, J.K., Vollebergh, W.A.M., Ormel, J., Verhaulst, F.C., & Huizink, A.C. (2009). Predicting life-time and regular cannabis use during **adolescence**: The roles of temperament and peer substance use: The TRAILS study. *Addiction, 105*(4), 699-708.
Perceived availability of licit and illicit drugs and guns COMMUNITY LEVEL: NEIGHBORHOOD	-	Marijuana use	Derzon, J.H. (2007). Using correlational evidence to select **youth** for prevention programming. *Journal of Primary Prevention, 28*(5), 421-447.