

Strategies/Interventions for Reducing Marijuana Use

The Substance Abuse and Mental Health Services Administration's (SAMHSA) Center for Substance Abuse Prevention (CSAP) has highlighted three considerations in determining which interventions provide the best fit for a community's comprehensive prevention plan¹:

1. Conceptual fit: Is the intervention relevant and logically connected to identified risk factors and outcomes?
2. Practical fit: Is the intervention appropriate given the culture of a particular community, taking into account community readiness, the community's population, and general local circumstances?
3. Strength of evidence: Is there sufficient documented evidence to support the strategy's efficacy?

The current document summarizes the strength of evidence found in the literature for strategies that may affect the initiation, escalation and consequences of marijuana use.

There are a broad number of universal prevention programs for marijuana use with evaluations of varying methodological quality found in the peer reviewed literature. Meta-analytic work suggests that these types of universal school-based prevention programs have a 27.9% success rate over control groups in reducing marijuana use among adolescents (Porath-Waller, Beasley, & Beirness, 2010). Although meta-analytic work is critically important in its ability to summarize findings across multiple studies, this particular study was unable to “unpack” multiple component interventions to determine which components significantly contribute to program success. While other researchers have completed component analyses for alcohol use or for a specific program (i.e., Northland) (i.e., Stigler, Perry, Komro, Cudeck, & Williams, 2006), there have been no component analyses published in the peer-reviewed literature for strategies impacting marijuana use. In addition to identifying broader environmental, school, and family-based strategies, the current document seeks to “unpack” universal prevention programs, to determine which particular components are the most effective at reducing marijuana use, and which appear to have limited or no utility.

¹ From SAMHSA's “Identifying and Selecting Evidence-Based Interventions”, published in January, 2009. (Available at: http://www.ncspfsig.org/Project_Docs/2009%20Evidence-based%20guidance%20document.pdf)

Methods

A literature search was conducted using PSYCHINFO, PUBMED, and EBSCO to look for articles published between 2006 and 2010. Initial search terms included “marijuana”, in combination with “strategy” and “intervention”. The search was then broadened to include identified strategies for other substances of abuse (both legal and illegal), particularly in the “community” domain, where there was scant published research for marijuana.

A search was then conducted through The Substance Abuse Mental Health Service Administration’s National Registry of Evidence Based Prevention Programs to look for programs with reported effects on marijuana use. The program description was then deconstructed to generate a list of component strategies (i.e., parent training, peer leadership, alternative activities). A search was then conducted using PSYCHINFO, PUBMED, and EBSCO to search for “marijuana” and these component strategies. Some strategies did not have peer-reviewed, published studies examining their efficacy in reducing marijuana use. For these strategies, the search was broadened to look at the strategy’s effectiveness with other substances of abuse (both legal and illegal).

A Ph.D.-Level reviewer examined studies for methodological quality, including only those studies that accounted for well-known confounds, applied appropriate statistical tests, and used well-defined measures.

Document Organization

This paper is organized into 5 global domains (i.e., Community/Neighborhood, School, Family, Peer, and Individual). The first column under each domain identifies common risk and protective factors. The document is organized by these risk factors because each of these factors can provide a unique point of entry for intervening. The second column (“Related Strategies”) points to various strategies that may relate to the identified risk factor.

The third column (“Evidence Level”) summarizes existing literature by ranking the strategy into one of the following categories:

- Evidence of direct effects on ATOD use in general, and marijuana use specifically.
 - *Supported by at least 2 studies from the peer-reviewed prevention literature. At least one of these studies reported results specifically for marijuana.*
- Little or no evidence of direct effect
 - *At least one peer reviewed study in the prevention literature shows that this strategy does not impact use. This finding was not contradicted by other published research.*
- Theoretical support, insufficient evidence
 - *The specific application of the strategy to marijuana is untested and/or has not been published in the peer-reviewed prevention literature, particularly during the past 5 years. Existing research may be inconsistent (reaching significance in some studies, but not significant in others).*

The “Supporting Research” column provides more in-depth analysis of available literature.

Community Neighborhood

Risk Factor	Related Strategies	Evidence Level	Notes on Supporting Research
Availability/ Opportunities to use	Civil Remedies to Disrupt Local Drug Markets	Theoretical support, insufficient evidence.	<p>In civil remedies, owners of properties from which drugs are being sold are threatened with civil suits, which can result in fines, closure, or confiscation of the property unless drug sales are terminated.</p> <p>The specific application of this strategy to marijuana is untested. There is some evidence to suggest that civil remedies combined with traditional enforcement may result in a larger decrease in drug sales than traditional enforcement alone. However, research on this topic is generally (a) not published in peer-reviewed journals, and (b) largely over a decade old (as cited in Birkmayer, Fisher, Holder, and Yacoubian, 2008).</p>
	Increased enforcement efforts to arrest suppliers and dealers	Theoretical support, insufficient evidence.	<p>Enforcement efforts to arrest suppliers and dealers can include:</p> <ul style="list-style-type: none"> • Concentrated sweeps and directed patrols • Undercover “buy and bust” operations • Citizen surveillance programs (i.e., tip lines) <p>There have been no peer-reviewed evaluations of the applicability of this strategy in reducing marijuana abuse published in the last 5 years. However, older law enforcement literature suggests that without reinforcement from additional strategies, drug sales will generally pick up once targeted enforcement resources are removed (as cited in Birkmayer, Fisher, Holder, and Yacoubian, 2008). NREPP programs that stress increased enforcement generally do not see improved effectiveness at reducing ATOD use at an individual level, most likely because such strategies seek to produce change at the community level (Hansen et al., 2010).</p>
	Price	Theoretical support, insufficient evidence.	<p>Studies on the price of illicit drugs are limited because proxies are required to estimate price. Econometric studies have demonstrated that unlike alcohol and some other drugs, marijuana use may not be sensitive to price, but these findings have varied depending on the identified proxy measure for price (De Simone and Farrelly, 2001; Pacula and Chaloupka, 2001). Inconsistencies in the literature might also reflect the various noneconomic ways that people exchange marijuana. In fact, NSDUH data from 2008 indicate that youth are most likely to obtain marijuana from friends and are most likely to get it for free.</p>

			However, even if price did impact use, historical evidence suggests that increases in enforcement only have a modest (if any) effect on price, making price difficult to impact through community intervention (as cited in Birkmayer, Fisher, Holder, and Yacoubian, 2008).
	Enacting harsher penalties for distribution, purchase and possession	Theoretical support, insufficient evidence.	Conventional enforcement may be more efficacious than minimum mandatory penalties. Criminal Justice scholars suggest that drug consumption may be more affected by arresting and sentencing more dealers to conventional terms than by sentencing fewer dealers to longer terms (as cited in Birkmayer, Fisher, Holder, and Yacoubian, 2008). This issue has not been specifically explored in peer-reviewed prevention literature for marijuana in the past 5 years.
	Decreasing the availability of drug paraphernalia	Theoretical support, insufficient evidence.	Decreasing the availability of drug paraphernalia (e.g., rolling papers, pipes) can include restricting its sale, removing displays from the checkout counter, or convincing shop owners not to sell rolling papers individually. This issue has not been specifically explored in peer-reviewed prevention literature for marijuana in the past 5 years.
Community Norms Favorable Toward Drug Use	Using mass media to increase public concern about use and change normative perceptions.	Evidence of direct effects on ATOD use in general, and marijuana use specifically* *Must be sufficiently targeted and have high dose. Should be reinforced by other strategies.	Increased media attention can increase community concern about harms (as cited in Birkmayer, Fisher, Holder, and Yacoubian, 2008). Mass media campaigns have shown some efficacy in reducing marijuana use among high sensation seekers, although the message must be carefully targeted and the media campaign must have high levels of reach and frequency (Palmgreen et al., 2001). Media campaigns around marijuana use should not be used in isolation, but combined with other strategies (particularly school-based reinforcement of message) (Slater et al., 2006).
	Use of Community Coalitions to affect change	Evidence of direct effects on ATOD use in general, and marijuana use specifically* *Requires a well-developed coalition and action plan. Research reporting changes in marijuana use used a coalition with a great deal of proactive university assistance and a small menu of allowable strategies.	Community coalitions are popular vehicles for health promotion. Coalitions can be used to conduct needs assessments, mobilize resources, select and implement strategies, and complete evaluations. This method has demonstrated effectiveness for ATOD use in general (as cited in Brounstein, Zweig, and Gardner, 1998) and marijuana use specifically (Spoth et al., 2007), although it is important to note that in this study, the coalition was offered a small menu of strategies and proactive technical assistance through a cooperative grant with a local university. Community coalitions are successful when they have a clear, shared vision of the coalition's objective, have committed partnerships and active participation from various community sectors, and utilize a broad menu of prevention strategies (as cited in Brounstein, Zweig, and Gardner, 1998).

			Community-coalition partnerships which involve local university support can be particularly powerful because the expertise of local researchers can encourage high fidelity implementation of various NREPP strategies (as cited in Spoth et al., 2010).
Neighborhood quality, community disorganization, low neighborhood functioning, high level of transitions and mobility, low community attachment	Altering the physical environment	Theoretical support, insufficient evidence.	<p>Altering the physical environment may include:</p> <ul style="list-style-type: none"> • Boarding up abandoned buildings • Cutting back shrubbery to make drug deals more visible • Installing surveillance cameras in lobbies of apartment buildings with severe drug problems. • Improving lighting in high-crime areas • Altering traffic patterns to make drive-by purchases more difficult. <p>Such measures are relatively easy for communities to implement, and evidence from the broader crime-prevention field has shown that they do deter some forms of crime (as cited in Birkmayer, Fisher, Holder, and Yacoubian, 2008). To date, no peer-reviewed, published research has evaluated the efficacy of such measures on disrupting marijuana sales.</p>
	Increasing community connection/Enhanced socialization/bonding	Theoretical support, insufficient evidence.	<p>NREPP programs that offer opportunities for positive social involvement are generally met with increased success in ATOD prevention (Hansen et al., 2010). However, it is important to note that this research is based on NREPP programs as they stood in 2004, and that this research looked at ATOD use in general. The review included all evaluation studies for which an effect size could be estimated, and did not account for study design or methodological rigor.</p> <p>Other studies have found similar results. For example, a longitudinal study by Rhodes, Reddy, and Grossman evaluated the impact of mentoring programs on general drug use (i.e., “How many times did you use drugs in the past month?”). They found that mentoring was significantly associated with decreased drug use, and that greater mentor involvement produces greater results. Short-term relationships are not likely to produce the impact seen in longer term relationships (i.e., 12 months or more) (Rhodes, Reddy, and Grossman, 2005).</p> <p>The specific impact on marijuana has not been studied.</p>

School

Risk Factor	Related Strategies	Evidence Level	Notes on Supporting Research
Academic failure/ Academic Achievement	Academic Skills Enhancement (including tutoring, vocational training, and college preparation)	Theoretical support, insufficient evidence.	<p>A meta-analysis of NREPP programs found that using the school as the setting for implementation may be particularly effective (Hansen, 2010). Teachers can serve as important gate-keepers of school- and family-based interventions, as they are well-equipped to both identify high-risk youth and to communicate their concerns to parents or other school personnel to motivate further intervention (Connell, Dision, Yasui, & Kavanagh, 2007).</p> <p>Teachers may not, however, be the ideal messengers of program content. Meta-analyses have suggested that others (mainly mental health professionals or prevention specialists) elicit better outcomes for marijuana use, possibly because they are better able to generate discussion or may be more credible (Porath-Waller et al., 2010).</p>
School environment/ school level use	Changing School Climate		<p>NREPP programs that include academic skill enhancement for students and classroom management techniques for teachers are associated with increased efficacy at reducing ATOD use, according to a meta-analysis. In fact, programs that stress school-level change and the attainment of academic skills may be among the most effective NREPP programs in ATOD prevention (Hansen, 2010). However, it is important to note that this research is based on NREPP programs as they stood in 2004, and looked at substance use in general. The review included all evaluation studies for which an effect size could be estimated, and did not account for study design or methodological rigor.</p> <p>More research is needed to evaluate how/whether these strategies work with marijuana use specifically.</p>
Low bonding to school/ opportunities for positive school environment	See also “Increasing community connection/Enhanced socialization/bonding”, and “Alternative Activities (including volunteer work)”		

Family

Risk Factor	Related Strategies	Evidence Level	Notes on Supporting Research
Family marijuana use/Family history of marijuana use	Social and personal competence skills (Parent/family)	Evidence of direct effects on ATOD use in general, and marijuana use specifically (with cautions and conditions!).	<p>Research on family interventions is limited because few studies have examined which specific mechanisms of the intervention are related to reduced marijuana use. For example, Connell, Dishion, Yasui, and Kavanah (2007) examined the utility of the Family Check-Up, but could only comment on the efficacy of global parent management practices. Similarly, Spoth et al. (2001) examined the utility of Drug Free Years and Strengthening Families (both NREPP programs) but could only comment on the efficacy of global family skills training.</p> <p>A meta-analysis by Hansen (2010) found that NREPP programs that included some family involvement performed better in reducing ATOD use in general than those programs that either ignored the family or focused exclusively on the family. In general, in order to be effective, family interventions must:</p> <ul style="list-style-type: none"> • Be theory based (addressing those risk and protective factors related to the family) (Spoth, Redmond, & Shin, 2001) • Be developmentally appropriate and well-timed (particularly during the transition from early to mid-adolescence) (Spoth, Redmond, & Shin, 2001) • Offer workshops to improve parent and adolescent skills, offering sessions where parents and youth work both together and separately (as cited in Brounstein, Zweig, and Gardner, 1998) • Utilize interactive techniques in skill development (as cited in Komro & Toomey, 2002) • Ensure that families are fully engaged (Spoth, Redmond, & Shin, 2001). <p>Regarding positive family interaction, brief strategic family therapy (a one-hour office based therapy which restructures maladaptive family communication patterns) may be more effective than adolescent-only group therapy in reducing marijuana use for at-risk Hispanic youth, although this study did not involve random selection and varied in treatment dose, limiting the generalizability of findings (Santisteban et al., 2003).</p> <p>A convenience sample on parental monitoring found that parents were more likely to have an accurate understanding of their child's marijuana use following an intervention on monitoring, but that this did not change the child's actual risk behavior. This suggests that both parents and youth need to be targeted in</p>
	Parent education/training around use		
	Stress management (parents and families)		
Parental monitoring/ Clear standards/ consistent enforcement of discipline	Parental Monitoring		
	Parental training in clear standards and consistent discipline		
Family attitudes favorable toward use and delinquency	Parental training around communication of disapproval of use		
Family conflict/ Poor family management/ Low parental attachment/few opportunities for positive family involvement	Parental and Family Training around family management and positive family interaction		
	Enhanced family bonding through		

	shared activities		interventions in order to reduce risk (Li, Stanton, Galbraith, Burns, et al., 2002). Although this was a randomized controlled study, it largely included African American parents and was a sample of convenience, limiting its generalizability.
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Peer

Risk Factor	Related Strategies	Evidence Level	Notes on Supporting Research
Peer attitudes toward drug use/Peer marijuana use/ Perceptions of peer use	Peer leadership	Theoretical support, insufficient evidence.	<p>A variety of peer-led programs have been shown to be efficacious in reducing alcohol use (e.g., Project Northland), but whether peer-leadership itself is a critical component of this success remains unclear. A systematic review by Mellanby, Rees, & Tripp (2000), suggested that health education interventions for youth that are exclusively peer-led or involve some peer led components are at least as effective as adult-led interventions. This systematic review was hampered, however, by broad variability in the methodological quality of included studies and by general publication bias, and did not look at marijuana use interventions specifically.</p> <p>Peer-led programs can be complicated to implement because they require extensive training for leaders. Further, a peer leader’s reputation in the school can affect how they are perceived by intervention participants. Finally, peers may not be able to facilitate the interactivity required for successful programming (Porath-Waller et al., 2010). There is some evidence (at least among high-risk youth) that those with previous drug experience are the most credible sources of drug-related information (as cited in Porath-Waller et al., 2010).</p> <p>More research is needed.</p>
	See also “Refusal Skills” and “Social and personal competence skills (including Interpersonal problem-solving skills)”, and “Changing Social Norms”		
Peer Delinquency/ Perceptions of peer delinquency	See also “Refusal Skills” and “Social and personal competence skills (including Interpersonal problem-solving skills)”, “Peer Leadership”, and “Enhanced Socialization/bonding”		

In general, individual-level programs should be interactive and skill-based, with booster sessions to maintain change over time (as cited in Brounstein, Zweig, and Gardner, 1998).

Individual			
Risk Factor	Related Strategies	Evidence Level	Notes on Supporting Research
Personal attitudes toward use/ expectancies/ perceived risk	Attitudes toward use	Evidence of direct effects on ATOD use in general, and marijuana use specifically.	Global attitudes toward use (including commitment to being drug-free) appears to be proximally related to marijuana use. Stephens et al. (2009) and Fearnow-Kenney et al., (2002) suggest that attitudes toward use may be among the most promising targets in marijuana prevention programming.
	Perception of harm	Theoretical support, insufficient evidence	Stephens et al. (2009) found that although perception of harm does not directly impact marijuana use, it does impact intention to use. A meta-analysis of NREPP programs suggests that learning about the consequences of substance use impacts ATOD use only when the content is well-covered and the intervention is well-crafted with other skill-based components (as cited in Brounstein, Zweig, and Gardner, 1998; Hansen et al., 2010).
	Motivational Enhancement Therapy/ Cannabis Check-up	Evidence of direct effects on ATOD use in general, and marijuana use specifically.	Motivational Enhancement Therapy (MET) involves assessment of use, provision of feedback, and an exploration of a client’s motivations around behavior change. MET uses the principles of motivational interviewing, a therapeutic technique designed to elicit change (Walker et al., 2007). Recent meta-analyses examining the efficacy of motivational interviewing (MI) across a range of behaviors (including marijuana use) suggests that MI is at least as effective as other types of treatments and significantly more effective than no intervention in reducing marijuana use. Further, the meta-analyses found that in general, MI is effective for those with active symptoms of dependence and for broader samples of community users (Lundahl, Kunz, Brownell, Tollefson, and Burke, 2009; Lundahl & Burke, 2009). It is important to note that most research around MI has occurred in populations of users who self-identified as wanting to change their marijuana use – the effects of these interventions are not as well-tested among less motivated populations (Stephens, Roffman, Fearer, Williams, and Burke, 2007). In research with mandated college populations, it is difficult to disentangle the effects of being caught with marijuana and the effects of treatment.

	Individual level programs to change norms	Evidence of direct effects on ATOD use in general, and marijuana use specifically.	Normative Beliefs directly impact both use and intentions to use for ATOD use in general (Bosari and Carey, 2001) and marijuana use specifically (Stephens et al., 2009, Chabrol et al., 2006; Fearnow-Kenney et al., 2002) and are thought to be a staple of a good universal prevention program (Stephens et al., 2009; Fearnow-Kenney et al., 2002). Interventions that target normative beliefs must be careful to use substance-specific information.
	Media literacy	Theoretical support, insufficient evidence.	Media literacy programs help participants become more critical media consumers across a variety of media forms (e.g., magazines, newspapers, television, video games, the Internet). Training in media literacy has been effective in other health prevention efforts (e.g., alcohol use) (Austin & Johnson, 1997). Media Literacy around marijuana use specifically has not been formally evaluated.
	See also “Values clarification”		
Prior use of alcohol/tobacco/marijuana	See “Attitudes toward use”, “Perception of Harm”, “Values Clarification”, and “Refusal Skills”		
Antisocial behavior / Rebelliousness/ gang involvement	Values clarification	Theoretical support, insufficient evidence	Value clarification approaches involve developing or reaffirming individual values that are incongruent with marijuana or other drug use. A meta-analysis of NREPP programs suggests that values clarification, by itself, may not significantly impact ATOD use (Hansen et al, 2010). However, it is important to note that this research is based on NREPP programs as they stood in 2004, and looked at substance use in general. The review included all evaluation studies for which an effect size could be estimated, and did not account for study design or methodological rigor.
	See also “Refusal Skills”, “Personal Competence Skills”, “Training in general Communication and social skills” and “Increasing community connection/Enhanced socialization/bonding”		
Psychiatric disorder	See “Personal Competence Skills”.		
Religiosity, belief in the moral order, and Pro-social Behavior (As a Protective Factor)	Alternative Activities (including volunteer work)	Theoretical support, insufficient evidence.	Alternative activity programs are interventions that promote positive activities (e.g., sports, volunteer work) and positive social influences (e.g., mentors, positive peer leadership). A meta-analysis of NREPP programs found that those offering alternative activities are generally more successful in than those that do not (Hansen et al.,

			<p>2010). However, alternative activities may NOT be more effective than social and life skills training programs in preventing ATOD use (as cited by Carmona & Stewart, 1996). Alternative activities appear to be most effective for youth at high-risk, and should be used as part of a larger comprehensive prevention plan (as cited by Carmona and Stewart, 1996).</p> <p>More research is also needed around marijuana use and alternative programs, as most previous research has focused on ATOD more generally.</p>
Sensation seeking/ Impulsivity/ Risk Taking	See "Personal Competence Skills".		
Refusal skills	Training in refusal skills	Theoretical support, insufficient evidence.	<p>In a longitudinal study, Stephens et al., (2009) found that refusal skills impact intention to use but not use itself. A meta-analysis of NREPP programs found that the inclusion of resistance skills training did NOT improve a program's effectiveness at ATOD reduction (Hansen et al., 2010).</p> <p>A systematic review by Lemstra (2010) contradicts these findings, demonstrating that comprehensive programs that include refusal skill training result in a mean reduction of 7 days of marijuana use per month. Lemstra was unable to compare these comprehensive programs to knowledge-only programs, because only one study in the peer-reviewed literature looked at knowledge-only programs and marijuana use. Lemstra's findings are therefore limited.</p> <p>Meta-analytic work (i.e., Tobler et al., 1999; Porath-Waller, 2010) suggests that the use of several different strategies (including social competency training) leads to increased effectiveness in marijuana use prevention.</p> <p>More research is needed.</p>
General Communication skills, social skills, and personal competence skills	Training in general Communication and social skills	Theoretical support, insufficient evidence.	<p>Approaches that seek to improve interpersonal skills target social problem solving, friendship formation, and global communication skills.</p> <p>A longitudinal study by Stephens et al. (2009) indicated that teaching global communication skills did not impact intention to use or use itself.</p> <p>A meta-analysis of NREPP programs concluded that although this approach is popular, offering tools to improve social skills is NOT associated with increased program effectiveness at reducing ATOD use (Hansen, 2010).</p> <p>Meta-analytic work (i.e., Tobler et al., 1999; Porath-Waller, 2010) suggests that the use of several different strategies (including social competency training) leads</p>

			to increased effectiveness in marijuana use prevention. More research is needed.
	Personal competence skills	Theoretical support, insufficient evidence.	<p>Personal competence skills approaches involve enhancing self-esteem, developing impulsivity control, improving decision-making skills, and improving regulation of anger, stress, and anxiety. A meta-analysis of NREPP programs found that as of 2004, over half were invested in improving emotional regulation (Hansen et al., 2010).</p> <p>Improving self-regulation is only weakly associated with increased program efficacy at reducing ATOD use. Offering tools for improving self-esteem was not associated with increased program efficacy (Hansen et al., 2010). It is important to note that the work by Hansen et al. is based on NREPP programs as they stood in 2004, and that this research looked at ATOD use in general. The review included all evaluation studies for which an effect size could be estimated, and did not account for study design or methodological rigor.</p> <p>Although decision-making skills may not impact marijuana use itself, they may impact intention to use (Stephens, 2009), and, as such, may be a useful place to intervene.</p> <p>More research is needed.</p>

Age of initiation and Intention to use marijuana are also commonly identified risk factors for future use. In the intervention literature, these factors serve as targets for change.

The following commonly identified risk and protective factors are immutable. They may be used simply to identify and select individuals into preventative services:

- Gender
- Childhood physical and sexual abuse
- Socioeconomic status
- Race/ethnicity/acclturation
- Family history of alcohol or tobacco use

Derzon (2007) makes a strong case that prevention must maintain strong commitment to universal intervention. Although selective intervention does have its place, it cannot be the only prevention service provided, because our ability to predict users based on various risk factors is not perfect, and risk-focused interventions will ultimately target a non-trivial number of those unlikely to use, while missing a proportion of those at-risk for use..

Summary/Overview of Findings

Community Level	Civil Remedies to Disrupt Local Drug Markets	Theoretical support, insufficient evidence.
	Increased enforcement efforts to arrest suppliers and dealers	Theoretical support, insufficient evidence.
	Price	Theoretical support, insufficient evidence.
	Enacting harsher penalties for distribution, purchase and possession	Theoretical support, insufficient evidence.
	Decreasing the availability of drug paraphernalia	Theoretical support, insufficient evidence.
	Using mass media to increase public concern about use and change normative perceptions.	Evidence of direct effects on ATOD use in general, and marijuana use specifically (with cautions and conditions!).
	Use of Community Coalitions to affect change	Evidence of direct effects on ATOD use in general, and marijuana use specifically (with cautions and conditions!).
	Altering the physical environment	Theoretical support, insufficient evidence.
	Increasing community connection/Enhanced socialization/bonding	Theoretical support, insufficient evidence.
School Level	Academic Skills Enhancement (i.e., tutoring, vocational training, college prep)	Theoretical support, insufficient evidence.
	Changing School Climate	
Family Level	Social and personal competence skills (Parent/family)	Evidence of direct effects on ATOD use in general, and marijuana use specifically (with cautions and conditions!).
	Parent education/training around use	
	Stress management (parents and families)	
	Parental Monitoring	
	Parental training in clear standards and consistent discipline	
	Parental training around communication of disapproval of use	
	Parental and Family Training around family management and positive family interaction	
	Enhanced family bonding through shared activities	
Peer Level	Peer leadership	Theoretical support, insufficient evidence.
Individual level	Attitudes toward use	Evidence of direct effects on ATOD use in general, and marijuana use specifically.
	Perception of harm	Theoretical support, insufficient evidence.
	Motivational Enhancement Therapy/ Cannabis Check-up	Evidence of direct effects on ATOD use in general, and marijuana use specifically.
	Individual level programs to change norms	Evidence of direct effects on ATOD use in general, and marijuana use specifically.
	Media literacy	Theoretical support, insufficient evidence.
	Values clarification	Theoretical support, insufficient evidence.
	Alternative Activities (including volunteer work)	Theoretical support, insufficient evidence.
	Training in refusal skills	Theoretical support, insufficient evidence.
	Training in general Communication and social skills	Theoretical support, insufficient evidence.
	Personal competence skills	Theoretical support, insufficient evidence.

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