

**INSTITUTE FOR SOCIAL RESEARCH
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**Working Paper No.: 21
RELATIONSHIPS BETWEEN ABUSE OF DRUGS
AND VIOLENCE AND A REVIEW OF
EFFECTIVE TREATMENTS FOR
SUBSTANCE ABUSERS**

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New Mexico Criminal and Juvenile Justice Coordinating Council

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NOTE:

This working paper provides research information for the New Mexico Criminal and Juvenile Coordinating Council. It is **not** a statement of the Council's views or opinions.

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The Drug Policy Subcommittee expressed interest in further information regarding research on the relationship between drugs of abuse and violence. The following sections provide current research findings on the relationship between drugs and crime, and the relationship between alcohol, cocaine, amphetamines, and opiates and violence.

I. INFORMATION ON THE RELATIONSHIP BETWEEN DRUGS AND VIOLENCE

MODELS FOR UNDERSTANDING THE RELATIONSHIP.

The relationship between drugs and violence has been explained using the tripartite scheme proposed by Goldstein (1986). Using this model, drugs and violence are linked through three dimensions: (1) the first dimension is termed “systemic”, describing the relationship of drugs and violence through drug trafficking and distribution; (2) the second dimension is termed “economic compulsion” denoting the association between violence and the acquisition of money to buy drugs, such as muggings and property crimes; and (3) the last dimension is termed “psychopharmacological”, describing how violent behavior can be induced by drugs, using both self-report and pharmacological studies. More recent models use four factors to analyze the relationship between drugs and violence: (1) broad social and economic forces; (2) encounters between people in particular settings; (3) individual behavioral development from childhood through adulthood; and (4) neurobehavioral and other biological processes that underlie all human behavior. The subcommittee expressed particular interest in information on the neurobehavioral processes underlying the relationship between drugs and violence.

RELATIONSHIP BETWEEN DRUGS AND CRIME.

Working Paper #7 reviewed the research describing the relationship between drugs and crime. The following information is taken from that paper.

Many studies have described a relationship between drugs and crime, but there are very few studies establishing a clear link between the two. Part of the problem is that most studies are correlative. This means that these studies can only show that crime and substance use are related, but cannot show how they are related or whether there is a causal, directional relationship between the drugs and crime. Undoubtedly, the relationship between drugs and crime is a very complex one, and many factors are involved.

One research method used to determine if there is a causal relationship between substance use and crime is to ask offenders if they committed a crime to obtain drugs. Researchers attempted to use this method in a study of inmates (BJS, 1991). Overall, 10% of federal prison

inmates, 17% of state prison inmates and 13% of convicted jail inmates said they committed their offense to obtain money for drugs. As might be expected, the crimes most likely to be committed for this reason were burglary (average over type of prison = 31%), robbery (average = 29%), larceny/theft (average = 24%) and various drug offenses (an average of 15%).

A statistical relationship can also be found between drugs and homicide. The FBI's uniform crime reporting program collected data on the percentage of total homicides that were committed during a narcotics felony (BJS, 1991). These numbers range from 3.9% to 7.4% between 1986 and 1993. This analysis presents the most conservative figures, as they included only homicides committed during a drug-related felony (rather than including all cases where drugs were involved), and they did not include cases where more a more serious felony, such as armed robbery was committed in addition to a narcotics felony.

A Bureau of Justice Statistics paper produced in 1992 reported that:

- Drug users report greater involvement in crime and are more likely to have criminal records than non-users.
- Persons with criminal records are more likely to report being drug users than persons without criminal records.
- Total number of crimes rise as drug use increases.

Further data supporting a relationship between drugs and crime include the following (Roth, 1994, p. 3).

- For at least the last several decades, alcohol drinking--by the perpetrator of a crime, the victim, or both--has immediately preceded at least half of all violent events, including murders, in the samples studied by researchers.
- Chronic drinkers are more likely than other people to have histories of violent behavior.
- Criminals who use illegal drugs commit robberies and assaults more frequently than do nonuser criminals, and they commit them especially during periods of heavy drug use.
- In a study of New York City murders in 1988, researchers classified more than half of the homicides (53%) as drug-related: 39% occurred in the course of drug distribution, 8% occurred through pharmacological effects of the drugs on the offender, 2% occurred while the offender was obtaining money to buy drugs, and 4% occurred through more than one of these links.
- Data from the 1991 National Household Survey on Drug Abuse revealed that drug use is a strong correlate of being booked for a crime, although age was a stronger correlate.

Cocaine use was the most important covariate of being booked for a crime in large metropolitan areas (Harrison & Gfoerer, 1992).

- Data from San Antonio, Texas indicated that Mexican-Americans with frequent alcohol use and positive drug tests were twice as likely to commit aggressive crimes than whites in the same category. However, the highest percentage of aggressive crimes was committed by whites who drank frequently and tested negative for drugs. More aggressive crimes were committed by men testing negative for any drug (Valdez, Kaplan, Curtis, & Yin, 1995).

GENERAL INFORMATION ON THE RELATIONSHIP BETWEEN DRUGS AND VIOLENCE.

The committee expressed interest in obtaining further information on the relationship between types of drugs and violence. Roth (1994) reviewed the recent literature on the relationship between violence and alcohol and illegal psychoactive drugs. Findings of the review are presented below.

- Research has uncovered strong correlations between violence and psychoactive substances, including alcohol and illegal drugs, however the underlying relationships differ by type of drug.
- Alcohol drinking and violence are linked through pharmacological effects on behavior, through expectations that heavy drinking and violence go together in certain settings (e.g., domestic violence), and through patterns of binge drinking and fighting that sometimes develop in adolescence.
- Of all psychoactive substances, alcohol is the only substance whose consumption has been shown commonly to increase aggression. After large dosages of amphetamines, cocaine, LSD and PCP, certain individuals may experience violent outbursts, probably due to preexisting psychosis.
- Connecticut reported that alcohol abuse was more directly associated with the violent crimes feared by the community, and that alcohol treatment should be a key component of an alternative sanctions program.
- Anecdotal reports notwithstanding, there is no research evidence to support the notion that becoming high on hallucinogens, amphetamines, or PCP stimulates violent behavior in any systematic manner. The anecdotes usually describe chronic users with histories of psychosis or antisocial behavior, which may or may not be related to their chronic use of drugs.

- More research is needed on the pharmacological effects of crack, which enters the brain more directly than cocaine used in other forms.
- Illegal drugs and violence are linked primarily through drug marketing: disputes among rival distributors, arguments, robberies involving buyers and sellers, and property crimes committed to raise drug money.
- Marijuana and opiates temporarily inhibit violent behavior, but withdrawal from opiate addiction tends to exaggerate both aggressive and defensive responses to provocation.
- Stories of violent outbursts by men using anabolic steroids appear to be isolated incidents rather than any common, systematic effect.
- Juvenile drug users were more likely to fight, take risks that predisposed them for assault, and were assaulted more than non-drug users (Kingery, Pruitt, & Hurley, 1992).

Research by Miller and Potter-Efron (1989) indicated that substance abuse-related acts of violence are likely the result of a combination of the physiological effects of the substances themselves, the underlying personality of the user, and the social setting that favors or disfavors aggression.

ALCOHOL USE AND VIOLENCE.

Alcohol is the only psychoactive drug that in many individuals tends to increase aggressive behavior temporarily while it is taking effect. Factors at various levels such as behavior patterns when people are not drinking, settings in which people drink, and local drinking customs can influence the strength of this relationship. Among alcohol abusers, individuals who also abuse other psychoactive substances, who are diagnosed with antisocial personality disorder, and whose parents had been diagnosed with alcoholism are at especially high risk of chronic violent behavior (Roth, 1994). Based on face to face interviews with a national sample of 1,887 convicted homicide offenders, Wieczorek, et al. (1990) estimated that alcohol was directly implicated in approximately 50% of all homicides. The role of alcohol in violent acts is not well understood. It is clear that alcohol is not the sole cause of violent behavior, as the majority of drinkers do not commit violent behavior (Shepherd et al., 1989).

In general, the neuropharmacology of alcohol is not well understood. Alcohol does not appear to interact with a specific neuroreceptor site in the brain (McKim, 1991), although there is some evidence to suggest that alcohol may have effects on the GABA_A and glutamate receptors. The GABA receptors are also the site of action of sedative/anesthetic drugs such as barbiturates and benzodiazepines. It is known that alcohol acts as a sedative, and that depression of central

nervous system function is the primary pharmacological effect of alcohol (Julien, 1995). Brain regions thought to be affected by alcohol consumption include the medial septal nucleus, the cerebellum (motor/balance area of the brain). Alcohol acts to induce sleep and to impair vision, reaction time, and balance. Behaviorally, people reported feelings of elation, friendliness, and energy at lower blood alcohol levels. In contrast, people reported feeling anger, depression, and fatigue during the drop of blood alcohol levels (Babor et al., 1983). In addition, alcohol consumption seems to decrease the ability of aversive events to act as suppressors on behavior, resulting in disinhibition.

COCAINE USE AND VIOLENCE.

Early research (Goldstein, 1986) indicated that much of cocaine-related violence was psychopharmacological. Individuals using cocaine described increased negative attitudes, irritability, hostility, aggression, anxiety, and suspicion. Again, it was difficult to separate the pharmacological effects of the drugs from pre-existing psychiatric conditions of the user. Cocaine can cause delayed sleep and insomnia. Initially, cocaine taken in high dosages causes an intense pleasurable feeling (the “rush”). Chronic high dosages of cocaine have been related to paranoia and psychosis. Currently, there is no evidence to support the claim that snorting or injecting cocaine stimulates violent behavior (Roth, 1994).

Findings from animal studies investigating the neurochemical relationship between cocaine and aggression have been at best equivocal. Some researchers have found that cocaine causes increased psychomotor activity and increased fighting in animals, whereas other researchers have reported results that fighting behaviors decreased with increased dosages of cocaine (Brody, 1990). In humans, the pharmacology of cocaine use is somewhat understood. Cocaine acts as a neurochemical modulator in the central nervous system (CNS). In particular, cocaine increases, at least initially, specific neurotransmitters including dopamine, norepinephrine, and serotonin through blocking the reuptake of these neurotransmitters in the synapse. Chronic use of cocaine has been postulated to decrease the neurotransmitter pool of dopamine, norepinephrine, and serotonin, resulting in decreased neurotransmitter stimulation. These neurotransmitters are closely linked with the pleasure-centers of the limbic system and with the basal ganglia (motor area). Brain levels of dopamine are associated with euphoria at lower levels of dopamine and dysphoria at higher levels of dopamine. Dopamine levels have also been found to be associated with drug cravings (Ritz, et al., 1987). Norepinephrine levels are related to degree of alertness.

AMPHETAMINE USE AND VIOLENCE.

Psychopharmacological effects of low dosages of amphetamines include increased alertness, euphoria, excitement, wakefulness, reduced sense of fatigue, loss of appetite, mood elevation, increased motor and speech activity, and feelings of power. At moderate dosages of amphetamines, psychopharmacological effects may include slight tremors, restlessness, greater increases in motor activity, insomnia, and increases in agitation. Individuals who chronically use high dosages of amphetamines may engage in continual, purposeless, repetitive acts and

experience sudden outbursts of aggression and violence, paranoid delusions, and severe anorexia (Julien, 1995). Increases in aggression are seen primarily in adults and the neuroanatomical location of the aggressive effects remains unclear (Julien, 1995). In contrast to the effects seen with adults, children who take amphetamine-like drugs for treatment of Attention Deficit/Hyperactivity Disorder appear to have reductions in aggressive behavior.

Amphetamines act as psychostimulant and its effects are similar to those of cocaine. Amphetamines affect the central nervous system by causing the release of the neurotransmitters dopamine, norepinephrine, and serotonin. Increases in dopamine result in behavioral stimulation and increased psychomotor activity, including repetition of meaningless acts. These effects are thought to take place in the basal ganglia (Julien, 1995).

OPIATE USE AND VIOLENCE.

The most common opiate of abuse is heroin. Heroin is a derivative of morphine and is about three times as potent. The primary effects of opiates are intense feelings of pleasure, loss of sensitivity to pain and sleepiness. Opiates tend to inhibit violent behaviors temporarily, but during withdrawal from opiate addiction tends to exaggerate both aggressive and defensive responses to provocations (Roth, 1994). Chronic opiate use does not appear to interfere with intellectual or physical abilities and “If there is a secure, cheap source of opiates, it is possible for someone who is physically dependent to maintain a normal life” (McKim, 1991, p. 248).

There are at least three types of opiate receptors in the brain. Opiates appear to produce their effects at several sites in the central nervous system including the spine, central gray (pain area), and brainstem, among others. Opiates appear to mimic the endogenous neurotransmitters endorphins or enkephalins. As mentioned earlier, there is no direct evidence relating opiate use and violence.

II. EFFECTIVE TREATMENTS FOR ALCOHOL ABUSE AND DEPENDENCY

The committee expressed interest in obtaining further information from research investigating the effectiveness of treatments for particular drugs. Research describing effective treatments for alcohol and illicit drug abuse and dependence is presented. Information on treatment for alcohol abuse and dependence was available from two primary sources: (1) outcome studies from the alcohol research literature and (2) reviews of currently existing alcohol programs from within corrections. Information from the second source, corrections programs, was presented in working paper #11 and #13.

ALCOHOL-SENSITIZING AGENTS.

Alcohol-sensitizing agents, such as disulfiram (Antabuse), are often used to deter alcohol consumption during treatment. Disulfiram in combination with alcohol consumption results in flushing, nausea, vomiting, and cardiovascular changes. Controlled clinical studies indicated that, although disulfiram use had little effect on long-term abstinence, patients who took disulfiram had fewer drinking days than those who were not taking disulfiram (Fuller et al., 1986).

ANTI-CRAVING AGENTS.

A variety of drugs including serotonin reuptake inhibitors, dopamine agonists, and opioid antagonists have been investigated for their ability to reduce alcohol cravings. Outcome studies of serotonin reuptake inhibitors indicated reductions in drinking in slightly more than one-half of the subjects (Naranjo et al., 1990). The outcome studies of dopamine agonists report mixed results as to the effectiveness of reducing alcohol cravings. Lastly, opioid antagonists, such as naltrexone, have been shown to be effective in decreasing alcohol consumption and relapse in alcohol-dependent individuals.

THERAPEUTIC INTERVENTIONS.

In a recent review of the alcohol treatment outcome literature, Miller et al. (1995) examined 219 outcome studies of 43 different treatment modalities. Information on the top five treatment modalities is presented:

Brief Intervention: Brief intervention was found to have the most positive outcome ratings of the 43 modalities reviewed. Brief intervention therapy is time limited and sets forth limited

treatment goals. The therapy remains focused on the presenting complaint (e.g., alcoholism) through active involvement of the therapist. It is essential that a rapid, early assessment be completed prior to the initiation of therapy. The assessment provides the therapist with information to formulate treatment goals. Treatment includes face-to-face therapy and homework (Koss & Butcher, 1986).

Social Skills Training: This treatment approach utilizes a primary focus on life problem areas, although not alcohol consumption per se. Drug users are taught the social skills necessary to function in society as a non-user. Programs typically include training in relapse prevention and skill development for seeking and obtaining employment (Stitzer & Higgins, 1995).

Motivational Enhancement: Motivational enhancement is a time limited intervention that focuses on increasing the client's motivation to change. Therapeutic techniques include giving advice, helping clients remove barriers to change (e.g., assistance with child care during therapy hour), providing the client with choices (e.g., choices for treatment goals), decreasing the desirability of continuing to drink (e.g., identify positive reasons to change), practicing empathy (e.g., the therapist is non-judgmental and non-confrontational), providing feedback (e.g., information on personal effects of alcohol, including lab results of liver functioning), and actively helping (Miller & Rollnick, 1991).

Community Reinforcement Approach (CRA): The CRA approach utilizes contingency-management procedures to decrease drinking behavior. Systematic interventions are used to improve family/marital relationships and vocational, social, and recreational skills (Stitzer & Higgins, 1995). In particular, clients agree to sample sobriety and stay sober for a limited, agreed upon time period. Clients are introduced to the benefits of using disulfiram and are encouraged to use it for a trial period. Specific skills are taught including communication skills, problem-solving training, drink-refusal skills, methods for establishing social support, restructuring negative thoughts, job counseling, and independence training (Meyers & Smith, 1995).

Behavioral Contracting: According to Hester and Miller (1995), behavioral contracting is used by therapists and clients to establish agreement on therapy goals. The use of behavioral contracting helps to make therapy goals explicit. The goals are detailed as to the steps required for attainment of the goals. Alternative behaviors are listed (e.g., behaviors that one could do instead of drinking that are positively reinforcing). Lastly, spouses are often included to increase the client's compliance with the goals. This technique has been used successfully with engaging clients in the use of disulfiram.

As noted in Appendix 1, there are few studies available to evaluate the effectiveness of 12-step programs such as Alcoholics Anonymous.

III. EFFECTIVE TREATMENTS FOR ILLICIT DRUG ABUSE AND DEPENDENCY

Therapeutic interventions for illegal psychoactive substances have undergone little systematic study. The available literature has focused primarily on opiate abuse or cocaine and crack abuse. Information regarding pharmacotherapy and psychotherapy for these drugs, including types of interventions and success rates, will be presented in this section.

COCAINE PHARMACOTHERAPY.

Pharmacotherapy research for cocaine addiction has followed three lines: (1) the study of antidepressants, as the clinical syndrome following cessation of cocaine use resembles depression, (2) the study of pharmacological agents with dopaminergic activity, as cocaine acts on the dopamine neurotransmitter system, and (3) the study of sensitizing agents (Kosten, 1993).

ANTI-DEPRESSANT PHARMACOTHERAPY.

Desipramine, an antidepressant, has been thoroughly studied using a randomized, placebo-control design. Findings indicated that study participants taking desipramine were abstinent significantly longer than participants taking a placebo. Additionally, individuals taking desipramine reported significantly fewer cravings than individuals taking a placebo. Overall, some studies have found desipramine to be an effective therapy for cocaine addicts. However, other studies have found less of a significant effect (Kosten, 1993).

DOPAMINERGIC AGENTS.

Cocaine is known to effect the dopaminergic reinforcement mechanisms in the brain. Agents that also effect the dopamine system are candidates for pharmacotherapy with cocaine addicted individuals. For example, flupenthixol, a long-acting dopamine antagonist, has been used therapeutically with cocaine addicted individuals. One study indicated that the use of flupenthixol resulted in improved retention in psychotherapy as well as decreased cocaine cravings. Animal research also indicated that dopamine antagonists are useful in blocking the effects of cocaine.

SENSITIZING AGENTS.

Carbamazepine, an anticonvulsant, has been used to treat cocaine addicted individuals. Carbamazepine is thought to reverse sensitization from cocaine. Initial studies suggest that carbamazepine, as well as other anticonvulsants, may reduce cocaine cravings and use. However, these agents have not been thoroughly studied, thus the above findings must be interpreted with caution.

PSYCHOTHERAPY FOR COCAINE ADDICTION.

There is limited literature available describing treatment options for cocaine addicted individuals. The majority of the published studies describe behavioral interventions (e.g., Grabowski, Higgins, & Kirby, 1993; Stitzer & Higgins, 1995). The techniques used in behavioral therapy for cocaine addiction are the same as those used in behavioral treatments of alcohol dependence (see above). The Community Reinforcement Approach (CRA) has been studied to determine its effectiveness in treating cocaine addicts. To date, four studies have demonstrated the efficacy of this approach for the outpatient treatment of cocaine abusers. The research in this area points to the importance of skills training, relapse prevention training, coping skills training, and neurobehavioral treatment for treating individuals addicted to cocaine.

METHADONE PHARMACOTHERAPY.

Methadone has become an important treatment modality for the approximately 100,000 individuals presently in treatment for opiate addiction. Methadone treatment has been shown to be effective in decreasing and suppressing heroin use and related crime activity. Methadone treatment is found to be most effective when paired with behavioral therapies such as those mentioned above.

IV. CONCLUSIONS

This working paper presents a review of the available information on the relationship between specific drugs and violence/crime. Although research in this area is growing, the exact relationship between drugs and violence/crime has yet to be established. It appears that alcohol is most clearly related to violence. It is also the case that New Mexican inmates are most likely to be diagnosed with alcohol abuse or dependence. Consequently, a focus on establishing programs that utilize known, effective interventions for alcohol addicted individuals would be beneficial. Again, it is important to remember that there is no available research suggesting that 12-step approaches are successful in treating this population.

This working paper has also reviewed the literature on psychotherapeutic and pharmacological treatments for alcohol, cocaine, and opiate addictions. Behavioral interventions appear to be more successful than other psychotherapeutic intervention. Behavioral techniques in association with pharmacological interventions typically are the most successful intervention with addicted populations.

POLICY IMPLICATIONS.

- Based on the review of the literature, it appears that there are therapeutic approaches to substance abuse treatment that have demonstrated effectiveness. It would seem reasonable to provide funding to those agencies that utilize these techniques.
- Based on the review of the literature, it appears that alcohol abuse and dependence is most commonly and consistently linked to violent behavior. Intervention programs focusing on this population would likely be beneficial.

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APPENDIX

**SUMMARY TABLE OF TREATMENT STUDIES
OF ALCOHOL DEPENDENT INDIVIDUALS**

Table 2.4 Summary of Cumulative Evidence Scores
(from Miller, Brown, Simpson, et al., 1995, Chapter 2)

TREATMENT MODALITY	Np	Nn	WEIn	MQS	SEV	CES	COST
Brief Intervention	17	6	-26	13.0	2.5	+239	46
Social Skills Training	11	5	-15	11.1	3.8	+128	270
Motivational Enhancement	5	2	+6	13.6	3.0	+87	46
Community Reinforcement Approach	4	0	+6	13.3	3.0	+80	492
Behavioral Contracting	4	0	+6	10.8	3.8	+73	164
Aversion Therapy, Nausea	3	3	+1	10.3	3.8	+34	1380
Client-centered Therapy	3	1	-3	9.8	3.3	+34	738 *
Relapse Prevention	3	4	0	12.6	3.0	+34	433
Self-Help Manual	2	1	+1	12.7	3.0	+33	20 *
Cognitive Therapy	3	4	0	10.3	3.6	+22	433
Covert Sensitization	3	5	-1	10.9	3.5	+18	329
Marital/Family, Behavioral	3	2	+2	13.4	3.6	+15	513
Disuifiram	10	11	+7	10.8	3.8	+09	637
Behavioral Self-Control Training	14	16	+10	13.0	2.9	-07	105
Systematic Desensitization	1	2	-1	11.0	3.0	-07	120
Lithium	3	3	+1	00.3	3.8	-08	441
Marital/Family, Nonbehavioral	3	4	0	12.4	3.7	-22	513
Aversion Therapy, Electrical	6	9	+1	11.1	3.8	-25	410
Hypnosis	0	4	-4	10.8	3.8	-41	738
Milieu Therapy	3	7	-3	11.7	3.6	-41	1960
Psychedelic Medication	2	6	-4	9.9	3.6	-45	637
Unspecified "Standard" Treatment	0	3	-3	10.7	3.0	-53	738 *
Videotape Self-Confrontation	0	6	-6	10.8	3.8	-77	548
Antianxiety Medication	1	7	-6	7.4	3.3	-79	637
Metronidazole	1	10	-9	9.6	3.7	-102	637
Relaxation Training	3	11	-7	11.1	2.8	-109	120
Confrontational Counseling	0	7	-7	12.4	2.9	-125	375
Psychotherapy	1	9	-8	11.3	3.1	-127	4050
General Alcoholism Counseling	1	15	-14	11.3	3.4	-214	738
Educational Lectures/Films	3	18	-14	9.9	2.2	-239	135

MODALITIES WITH TWO OR FEWER STUDIES

TREATMENT MODALITY	Np	Nn	WEIn	MQS	SEV	CES	COST
Sensory Deprivation	2	0	+2	10.0	1.0	+40	92 *
Developmental Counseling	1	0	+1	9.0	2.0	+28	738 *
Acupuncture	1	0	+1	10.0	4.0	+20	923
Exercise	1	1	0	10.5	2.5	+9	270 *
Aversion Therapy, Apneic	1	1	0	10.0	3.5	0	570
Problem-Solving Training	0	1	-1	12.0	4.0	-12	164 *
Functional Analysis	0	2	-2	11.0	2.5	-22	164 *
Self-Motivating	1	1	0	12.5	3.5	-23	20 *
Antidepressant Medication	0	2	-2	6.0	3.0	-24	457
BAC Discrimination	0	2	-2	12.0	3.5	-24	500 *
Calcium Carbirruide	0	2	-2	10.0	4.0	-32	637
Antipsychotic Medication	0	2	-2	9.0	3.5	-36	637
Alcoholic Anonymous	0	2	-2	13.0	3.5	-52	0

Notes:

- Np = Number of positive (+1 or +2) studies
- Nn = Number of negative (+1 or +2) studies
- MQS = Methodological Quality Score (mean for modality)
- Sev = Population severity scor (mean for modality)
- CES = Cumulative Evidence Score

Cost = Estimated cost to deliver treatment modality, in 1990 U.S. dollars. Figures are derived from Holder and colleagues (1991), except for starred (*) items not included in their list, which were estimated by the authors from the costs of similar treatments in the list. The price charged for a treatment may, of course, dramatically exceed this estimate base cost of delivery.