



## BEHAVIOR THERAPY FOR DRUG ABUSE: A CONTROLLED TREATMENT OUTCOME STUDY

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**Summary**—82 *Ss* were studied in a comparative evaluation of a behavioral vs supportive treatment for illegal drug use. Behavioral treatment included stimulus control, urge control, contracting/family support and competing response procedures for an average of 19 sessions. 37% of *Ss* in the behavioral condition were drug-free at 2 months, 54% at 6 months, and 65% at 12 months vs  $20 \pm 6\%$  for the alternative treatment during all 12 months. The behavioral treatment was more effective across sex, age, educational level, marital status and type of drug (hard-drugs, cocaine, and marijuana). Greater improvement for this condition was also noted on measures of employment/school attendance, family relationships, depression, institutionalization and alcohol use.

### INTRODUCTION

Illicit drug usage is a major national problem (NIDA, 1990) for which no long-term controlled group outcome studies of psychological treatment have shown effectiveness. Promising results have been obtained in many studies with behavioral procedures as noted in recent reviews (Childress, McLellan & O'Brien, 1985; Tucker, Vuchineck & Downey, 1992). Direct reinforcement or behavioral contracting for abstinence has been employed by Stitzer, Bigelow, Lawrence, Cohen, D'Lugoff & Hawthorne (1977), Boudin Valentine, Inghram, Brantley, Ruiz, Catlin & Regan (1977), and most recently by Budney, Higgins, Delaney, Kent and Bickel (1991). Pavlovian association training has been used in which drug-related images were paired with aversive scenes as in covert sensitization (Gotestam & Melin, 1974; Wisocki, 1973) or implosion therapy (Hirt & Greenfield, 1979). In the related area of alcohol abuse, additional procedures have been employed such as stimulus control and competing response training (Hurst & Azrin, 1973; Sobell & Sobell, 1973), and behavioral marital therapy (Hedberg & Campbell, 1974; O'Farrell, Cutter & Floyd, 1984). A great need exists for a controlled group outcome study to determine whether psychological interventions can be effective in the treatment of drug abuse. The present study incorporated the procedures of stimulus control, competing response training, behavioral contacting and imaginal rehearsal of consequences in a treatment program that was evaluated in a controlled group outcome design.

### METHOD

#### *Subjects*

The final study sample consisted of 82 *Ss* recruited from agencies and through newspaper advertisements. Individuals were eligible for inclusion if they had used illegal drugs at least once during the past month and during the initial 1 month assessment period, were not currently under psychological treatment, had resided locally for the past 12 months, lived within 12 miles of the counseling center. They were included in the data analysis if they completed 4 or more treatment sessions, and drug-use data were obtained for 12 months.

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### Experimental design

After an initial 1 month baseline/assessment period, eligible participants were randomly assigned by a coin flip to either the Behavior Therapy or Non-behavioral treatment. When several participants were concurrently available for assignment after baseline assessment, they were divided into pairs matched for problem severity and the coin flip determined assignment within the pair. The final study sample consisted of 46 Ss in the Behavioral condition and 36 Ss in the Non-behavioral condition.

### Demographics

Table 1 shows the demographic characteristics of the 82 Ss. The Ss were predominantly adults, male, unemployed and unmarried, with cocaine and marijuana the predominant drugs used. 9% of Ss were minority persons (Afro-American, Hispanic, Native American), 22% were mandated (agency referred) for counseling and 17% were youth (under 19 years of age).

To assess the comparability of Ss in the 2 treatment conditions, a *t*-test (two-tailed) or chi square test was performed for each of the demographic characteristics listed in Table 1. None of the characteristics was found to differ significantly between the Behavioral and Non-Behavioral Ss ( $P > 0.05$ ).

### Measures

During each session, reports were obtained from the S and his or her significant other regarding the type and frequency of drug use, days worked, school attendance, institutionalizations and police contacts. Family relationships were assessed for married/cohabiting adults by the Marital/Couple Happiness Scale (Azrin, Naster & Jones, 1973) and for youth by the Parent-Youth Happiness Scale (Besalel & Azrin, 1981), both of which included a report of overall satisfaction (0–100%) regarding the relationship by the subject and the spouse/parent. Depression was assessed by the Beck Depression Inventory (BDI) (Beck, Ward, Mendelson, Mock & Erbaugh, 1961). The Happiness Scales and BDI were scheduled monthly, including pre-treatment.

*Urinalysis.* Urine samples were obtained each session (observed by a staff member of the same sex). One sample each month during treatment underwent a broadscreen assay for all commonly abused drugs by the National Health Labs, an independent national testing facility which employs a SYVA EMIT enzyme amino acid assay technique and thin layer chromatography with a reported 95.5% accuracy. During pre-treatment sessions, this broad screen analysis was performed for every urine specimen. During the 12 months of treatment, the broadscreen analysis was performed once per month, selected randomly from one of the urine samples taken that month. All other urine samples were analyzed for the specific drugs that had been detected on any of the monthly broadscreen analyses. These specific drug analyses employed the Abusescreen Ontrak method

Table 1. Demographic characteristics of the study sample ( $N = 82$ )

Variable	Mean or <i>N</i>	Percent
Males	56	68
Females	26	32
Education	11.8 years	
Age	27.5 years	
Adults	68	83
Youth	14	17
Not full-time employed/school	41	50
Self-referred	64	78
Agency mandated	18	22
Minorities	7	9
Adults-not married/cohab	41	60
Adults-not full-time employed/school	34	50
Adults-school drop-outs	23	34
Youth-age	15.9 years	
Marijuana users	57	70
Cocaine users	53	65
Benzodiazepine users	10	12
LSD users	7	9
Heroin/other opiates users	6	7
Barbituate users	5	6
PCP users	3	4
Amphetamine users	1	1

(Roch Diagnostic Systems, Nutley, N.J.). Our reliability tests showed 97% agreement between the broadscreen and specific assay results.

### *Treatment*

Treatment integrity was monitored by (1) audio-tape recording of sessions and subsequent random review of the tapes, (2) presence of a non-participating observer during group sessions, and (3) use of a session checklist of specific treatment procedures. The counselors were college graduates or graduate students who had both training and experience in their respective treatment modality. The behavioral program counselors were given additional training in the new procedures specific to that type of program. Sessions were 1 hr in duration for individual counseling and 2 hr for group counseling. Group sessions were arranged for the non-behavioral program since that format is fairly typical for drug counseling agencies. Individual counseling was scheduled in the format of once per week for the behavioral program, with encouragement for additional sessions when feasible or desirable. Two group sessions were available each week for the non-behavioral participants, one for adults and one for youth. If *S*s were unable or refused to attend the fixed-date group sessions, individual sessions were scheduled at available times to avoid excessive study drop-out. This schedule was designed to, and succeeded in attaining approximate comparability regarding the number of sessions attended by *S*s in both experimental conditions while accommodating clinical and scheduling realities.

*Non-behavioral program.* The Non-behavioral program was designed to incorporate features commonly used in Non-behavioral group counseling for drug abuse and not to be a specified alternative type of counseling modality. Not used were the behavioral procedures of modelling, behavior rehearsal, specific therapy assignments, assigned self-recording between sessions, behavioral contracting, or structured stimulus control. Rather, the counselor encouraged expression of feeling, initiation of comments, reactions to comments of other group members, self-description of the history of one's drug usage, discussion of drug-related experiences and feelings and praise for abstinence desires. Interested significant others were invited to attend one group session per month.

*Behavioral program.* The Behavioral program included the typical Behavior Therapy format of therapist modelling, behavior rehearsal, specific therapy assignments, self-recording between sessions, review of the self-recordings and assignment records, and extensive praise for progress. The major specific procedures were: (1) Stimulus Control/competing response training, (2) 'Urge Control', (3) Social Control/Contracting.

The *Stimulus Control* procedure was designed to eliminate external stimulus situations that were precursors to drug use and to increase situations and activities incompatible with, or not associated with, drug use, as in the Community Reinforcement treatment for alcoholism (Hunt & Azrin, 1973). A 'Risk' list was constructed of the situations, persons and places associated with drug use. Similarly, a 'Safe' list was constructed of situations, persons and places incompatible or non-associated with drug use. A 'Daily Planner' recording form was utilized to schedule only activities from the 'safe' list for the following day. The duration of time spent in each situation or activity was entered daily on a prepared recording form and totalled for each list. The counselor reinforced the *S* for time spent in 'Safe' activities and problem solved, with the client and his or her significant other, how to increase the 'Safe' durations while decreasing the 'Risk' durations. Included routinely in the 'Safe' list were school, work, and family activities, since these are inherently reinforcing or functional in addition to being incompatible with drug usage. Included routinely in the Risk List were the persons, places and situations for which previous drug use had occurred.

*Urge Control.* Whereas the Risk List of the Stimulus Control procedure dealt with external stimuli, the second major behavioral procedure employed, 'Urge Control', was designed to interrupt internal stimuli, (proprioceptive sensations, urges, thoughts or incipient actions) associated with drug use and to then substitute competing internal and external stimuli. The specific steps were: (1) the most recent episode was identified from the subject's self-recordings in which drug use had occurred or, in the absence of recent use, was likely to occur (taken from the 'Risk' list recordings). While thinking aloud with closed eyes, (2) the *S* described the scene in great detail up to the point where the drug-related urge/thought/feeling was initially discernible, as noted by an

urge score less than 5 on a 0–100 scale of subjective units of intensity in which a score of zero designated no drug related thoughts, feelings or desire and a score of 100 designated total drug use preoccupation (See SUDS scale of Wolpe, 1958). (3) At the instant of discernibility, the *S* interrupted the narrative by saying ‘No!’ or ‘Stop!’, followed by brief phrases describing the negative consequence of drug use (e.g. ‘I’ll overdose and die; I’ll be arrested and raped in prison.’) as identified previously in the Annoyance Review (see below) as the predominant negative consequences (consequences rated at least 90 on a 0–100 scale of aversiveness) for that *S*. Strong negative affect was required when stating the negative consequences. (4) When the drug-related feelings were reduced to a zero level, the *S* engaged in self-relaxation consisting of muscular relaxation, breathing smoothly and slowly, and saying ‘Calm’ and ‘Relax’ for about 5 sec. (5) The *S* then imagined initiating an overt reinforcing activity (‘fun or functional’) that would compete with the drug urge and described in complete sentences, without pauses, the action and the intended benefits (reinforcement) thereof. (6) At the end of the trial, the *S* and counselor independently rated the *S*’s performance on a scale of 0–100% correctness on prepared recording forms for each of the listed dimensions: (a) immediate interruption, (b) affect and consequences, (c) relaxation, (d) self-talk, (e) competing activity and (f) description of benefits thereof. (7) Reinforcement was given for appropriateness, feedback was given as to the type of improvement needed and additional modelling by the counselor was provided if no improvement was evident on successive trials. On the same form, the *S*s noted the levels of the urge (0–100) at the start and completion of the trial to evaluate effectiveness and designated the component of the procedure that they felt to be most effective in reducing the urge. That component was to be stressed in the following trials. At least one (and usually more) trials were scheduled each session.

*Social Control.* The last major procedure was the Social Control procedure which was designed to motivate and assist abstinence through the influence of significant-others, and was used with youth, married or cohabitating adults, young adults still residing with their parents and when feasible with a close friend or an employer. The significant-other was urged to attend sessions with the *S* or to participate through the use of a speaker-phone when attendance was not possible. The Social Control procedure consisted of (a) assistance with therapy assignments and (b) behavioral contracting.

*Assistance in therapy assignments* by the significant-other was provided by promoting activities on the ‘Safe’ situation list, discouraging activities on the ‘Risk’ situation list and arranging alternatives, assisting in session attendance by providing transportation and reminders, and supervising assigned home Urge-Control practice. *Behavioral contracting* consisted of providing reinforcement contingent on drug incompatible activities. For youth, the typical responses in the contract included school attendance, early curfew adherence, increased social activities and time with parents, parental notification of whereabouts during all activities outside the home or school, homework study time, improved grades, session attendance, household chores, performance of therapy assignments and of course, the absence of evidence of drug use. For adults, the required responses were employment or seeking of employment using the behavioral Job Club procedure (Azrin & Besalel, 1980; 1983), money management by the spouse, accompaniment by spouse to all social activities and as with the youth, household chores and prior notification of whereabouts during activities outside the home. For youth and adults, also required was rehearsal of the Urge Control procedure as well as participation in major activities specified on the ‘Safe’ situation list and the absence of activities on the ‘Risk’ situation list as described in the stimulus control procedure above.

*Reinforcers* in the Behavioral Contract for youth included an increased allowance (to be spent under parent supervision), transportation by the parent, use of family car, later week-end curfew times, overnight visits to homes of ‘Safe’ friends, gifts, trips, telephone and television privileges, room privacy, special clothing or recreational items and less frequent session attendance. For adult couples, typical reinforcers were special social activities, reduction of household responsibilities, increased choice of type or frequency of sexual activities, trips and vacations and continued presence in the home (when eviction would have otherwise occurred).

The behavioral contracts included the following usual features: they (a) were written, (b) were signed and agreed upon by both parties, (c) included only observable actions as responses, (d) employed only controllable reinforcers, (e) employed reinforcers as an extra, or non-assumed

events, (f) included short-term (daily) and well as long-term reinforcers, (g) were recorded daily and reviewed on a prepared form, (h) were altered by the consent of both parties, (i) were reviewed at each session and (j) discontinued after long-term adherence.

Several secondary procedures were employed in the Behavioral program, each of which had been used in a similar manner in previous behavioral treatments: (1) Annoyance Review (Azrin & Nunn, 1973), (2) Positive Request Training, (3) Annoyance/Anger Prevention, (4) Relationship Enhancement as part of Behavioral Marital Therapy (Azrin, Besalel, Bechtel, Michalicek, Mancera, Carroll, Shuford & Cox, 1980), (5) Problem Solving (D'Zurilla & Goldfried, 1971) and (6) Job-Club employment-seeking for the unemployed (Azrin & Besalel, 1980; 1983).

The *Annoyance Review* was employed with all *Ss* in the initial session and was designed to enhance self-motivation for abstinence by having the *S* identify and list his or her major negative consequences for drug use and rate each on an intensity scale of 0–100. The counselor assisted the *S* in arriving at a score of 90 or greater for at least 2 consequences. These highly intense reasons for abstinence were subsequently used as the think-aloud negative consequences in the Urge Control procedure and reviewed when increased motivation for abstinence was needed.

The *Positive Request Procedure* taught the *S* how to request reinforcers in order to make the agreements inherent in the Behavioral Contract, as well as to improve communication and the relationship with significant others when necessary. The request was (a) to be for a specific and positive action, accompanied by statements as to (b) why this action was reinforcing to oneself and (c) to the significant other (d) to be followed by an offer to help in the performance of the requested action and (e) suggest alternative requests (f) in responding to a request, the *S* would either agree, or if not: (1) comment on some positive aspect of the request and then (2) suggest a modification or alternative following the same format as had the initial request until agreement was reached.

The *Annoyance/Anger Prevention* procedure was taught to reduce anger toward significant others when necessary to strengthen the relationship and to permit emotionally controlled use of the Positive Request procedure. Annoyance/Anger prevention consisted of (a) describing the problem in impersonal, non-blaming terms, (b) stating a possible external cause of the problem and (c) describing how the *S* him or herself might have contributed to, or might have prevented the problem. This was to be followed by the *Positive Request* procedure to resolve the problem constructively.

The *Problem Solving* procedure was used with *Ss* having difficulty selecting effective courses of action in avoiding drug-associated situations. It consisted of (a) defining the problem, (b) generating several alternative solutions and (c) selecting the most appropriate of the non-drug related alternatives.

The *Relationship Enhancement* procedure was employed when necessary to strengthen the relationship with the significant other and consisted of increasing provision of non-contingent reinforcers. The *S* and significant other were taught to (a) give compliments, (b) express appreciation, (c) make offers to help, (d) give pleasant surprises and (e) engage in a daily scheduled Pleasant Talk period only on topics of interest to the other person.

The *Job Club* procedure was used to obtain employment for the unemployed *Ss*. It consisted of structured and closely supervised job search techniques (Azrin & Besalel, 1980; 1983) and has previously been found effective with drug abusers (Azrin & Phillip, 1979).

## RESULTS

Figure 1 shows the monthly time course of illegal drug use of the Behavioral and Non-behavioral subjects during the 12 months of treatment. Drug-use for a given month for a *S* was considered to have occurred if a positive report was obtained for any illegal drug usage (excluding alcohol) at any time during that month from either the urinalysis, self-report or report by the significant other(s). All *Ss* used drugs prior to treatment. Figure 1 shows that in the Non-behavioral treatment, the proportion of *Ss* using drugs decreased during the first month to 80% of the *Ss* and remained at that general level ( $\pm 6\%$ ) for the subsequent 11 months. In the Behavioral treatment, the proportion of *Ss* using drugs decreased progressively: 63% at 2 months, 46% at 6 months and 35% of the *Ss* during the 12th month.  $\chi^2$  tests at each month ( $df$  1,  $N$  = 82) showed that the difference

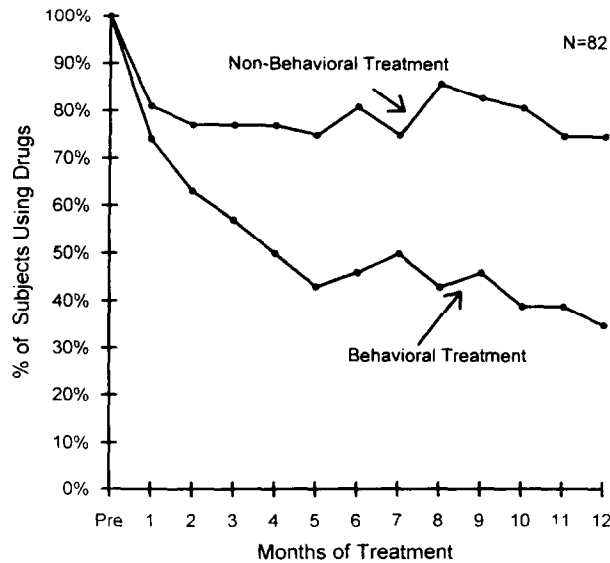


Fig. 1. Time-course of illegal drug use by *Ss* receiving either the Behavioral or the Non-behavioral treatment. 'Pre' designation on the abscissa represents the baseline pre-treatment period. Each data point is the percent of *Ss* using drugs during the designated month.

between the 2 treatments was statistically significant for each month after the 2nd month ( $P < 0.05$ ); for the 12 month,  $\chi^2 = 13.097$  (1,  $N = 82$ ), ( $P < 0.001$ ).

Table 2 shows the mean number of months for which the *Ss* were drug-free in the two treatment conditions for several sample characteristics. Comparison of the two treatments by *t*-tests showed that the Behavioral program produced a greater mean number of months of abstinence for adults (married or unmarried), youth, males, females, adult high-school graduates and drop-outs, primary hard-drug users, primary soft-drug users (marijuana) and agency mandated users as well as those who were self-referred. The differential (Non-behavioral vs Behavioral) effect was greater for youth and females. A two way ANOVA (youth-adult, Behavioral-Non-behavioral) showed that the youth abstinence was more likely to result from the Behavioral treatment than for adults [ $F(1,81) = 6.59$ ,  $P < 0.02$ ]. For the interaction of sex by treatment,  $F(1,81) = 13.77$ ,  $P = 0.33$ , which was not statistically significant.

In addition to the 82 *Ss* who completed at least 4 treatment sessions and provided the required 12 months of drug usage data, 11 participants failed to complete 4 or more treatment sessions (non-completers); no follow-up data collection was attempted for them. Drug usage data was obtainable for 82 of the 93 participants who did complete 4 treatment sessions, yielding a successful data recovery rate of 88%; the other 11 persons were reachable for only part of the 12 months

Table 2. Comparison of the mean number of months drug-free during the 12 month treatment period for selected *S* variables for the Non-behavioral vs Behavioral treatment *Ss*

Variable Sample characteristics	Months of abstinence				<i>N</i>	<i>t</i>	<i>P</i> (1 tail)
	Non-behavioral $\bar{x}$	(SD)	Behavioral $\bar{x}$	(SD)			
All subjects	2.6	(3.1)	6.2	(4.4)	82	4.19	<0.0001
Youth	0.6	(0.8)	8.9	(2.6)	14	8.04	<0.0001
Adults all	3.0	(3.2)	5.7	(4.5)	68	2.69	<0.005
Adults-married/cohab	3.4	(3.2)	6.7	(4.6)	27	2.18	<0.02
Adults not married/cohab	2.6	(3.4)	5.2	(4.4)	41	1.91	<0.05
Males	2.4	(2.9)	5.3	(4.5)	56	2.84	<0.01
Females	3.0	(3.5)	7.8	(3.9)	26	3.16	<0.01
Primary hard drug user	4.2	(3.3)	7.8	(4.0)	64	3.80	<0.001
Primary marijuana user	2.4	(3.7)	7.1	(4.9)	18	2.37	<0.02
Secondary marijuana user	1.5	(2.0)	5.2	(4.3)	42	3.00	<0.01
Primary cocaine user	2.9	(3.0)	5.4	(4.6)	45	1.99	<0.01
High school grad-adult	3.0	(3.2)	5.3	(4.6)	51	2.02	<0.05
Non-high school grad-adult	3.2	(3.4)	6.6	(4.6)	17	2.16	<0.05
Agency mandated	1.8	(2.7)	5.5	(4.3)	18	2.21	<0.05
Self-referred	2.9	(3.2)	6.3	(4.4)	64	3.41	<0.001

and are therefore not included in data analysis. These 22 non-completers/non-reachables were assessed for comparability by comparing them to the study sample ( $N = 82$ ) for the number of days of drug use during the pre-treatment baseline. A  $t$ -test revealed no statistically significant difference,  $t = 0.25$  ( $df$  102),  $P = 0.80$ . To assess whether the non-completers/non-reachables were more frequent in one of the treatments, they were compared with the number of  $S$ s who did complete treatment and had 12 months of data: the number was not found to be different for the two treatment procedures: chi square = 1.61, ( $df$  1,  $N = 104$ ),  $P = 0.21$ .

**Urinalysis.** The principal measure of drug usage in Table 2 and Fig. 1 was determined by the presence of any indication of drug use during the month by either urinalysis, self-report or report by significant other(s). When only the objective urinalysis results were used, the data showed that the mean number of months with a positive (indicating drug use) urinalysis was statistically less for the Behavioral program subjects than for the Non-behavioral program  $S$ s:  $t = 2.08$  (80  $df$ )  $P < 0.05$ . Not statistically different between the two programs was the number of urinalyses obtained ( $P = 0.35$ ), nor the number of months for which a urinalysis was obtained ( $P = 0.93$ ).

Drug usage was also analyzed in terms of the number of days of drug use, a measure that gives greater weight to the  $S$ s self-reports than to the urinalysis since a positive urinalysis can legitimately be considered indicative of drug use only on one day, whereas verbal reports of every day use are possible. The data showed a mean of 2.1 days/month of hard drug use for the Behavioral program vs 5.4 days/month for the Non-behavioral program. This difference was statistically significant,  $t = 2.25$  ( $df$  80),  $P < 0.02$  using the  $t$ -test of differences relative to pre-treatment. The average number of days of marijuana use was also statistically significantly less (2.2 vs 3.8 days/month) for the Behavioral subjects: ( $t = 2.36$ ,  $P < 0.02$ ).

The mean number of treatment sessions attended during the 12 months was 1.6 sessions per month for the Behavioral program vs 1.9 sessions per month for the Non-behavioral program. This difference was not statistically significant:  $t = 0.80$  ( $df$  80),  $P = 0.43$ . The frequency of sessions decreased during the course of the 12 month treatment for both the treatment programs. For the Behavioral program, the mean number of sessions decreased from 2.6 per month during the first 3 months to 0.7 sessions per month (1 session every 6 weeks) during the last 3 months. Similarly, for the Non-behavioral program, session frequency decreased from 2.7 per month to 0.9 sessions per month.

Table 3 presents the data obtained for the behaviors and test scores related to illegal drug use in the two programs at pre-treatment and during the 12 months of treatment. Table 3 shows that school attendance and employment increased from 52.2% at pre-treatment to 73.6% during treatment for the Behavioral program, whereas a slight decrease occurred for the Non-behavioral program. Reported alcohol use decreased by almost one-half for the Behavioral treatment vs a slight increase for the Non-behavioral treatment. Depression, as measured by the BDI, decreased from a pre-treatment moderate level to a non-depressed level during treatment, a decrease greater than for the Non-behavioral treatment. Police contacts did not differ between treatments. Parental satisfaction with their youth ( $S$ s) increased from a level of 43% satisfaction pre-treatment, to a 78% level of satisfaction during treatment for the Behavioral program. Youths' ( $S$ s') satisfaction with their parents in Behavioral treatment also increased, but not to a statistically significant degree ( $P = 0.10$ ) relative to the Non-behavioral treatment. For both the adult  $S$ s and their partners or spouses in the Behavioral program, Couple Happiness scores increased, whereas the Satisfaction

Table 3. Drug-related behaviors and test scores

Variable	Pre-treatment		Treatment		$N$	$t$	$P$ (1 tail)				
	Non-behavioral $\bar{x}$	Behavioral (SD) $\bar{x}$	Non-behavioral $\bar{x}$	Behavioral (SD) $\bar{x}$							
School/work (% days)	67.8	(40.8)	52.2	(41.5)	64.5	(34.4)	73.6	(30.1)	81	3.33	<0.001
Alcohol (days/mth)	4.9	(7.8)	7.0	(8.1)	5.8	(7.0)	3.8	(5.3)	81	3.78	<0.001
Depression (BDI score)	13.5	(7.7)	17.9	(11.7)	8.9	(7.8)	7.2	(6.2)	71	2.62	<0.01
Institutionalized (days/mth)	0.22	(1.0)	0.28	(1.9)	1.23	(3.5)	0.16	(0.56)	82	1.80	<0.05
Police contact (No./mth)	0.39	(1.11)	0.26	(0.61)	0.12	(0.21)	0.06	(0.11)	82	0.39	=0.35
(%) Parent satisfaction	50.8	(14.3)	42.9	(23.6)	55.7	(26.3)	78.3	(18.3)	13	2.71	<0.02
(%) Youth satisfaction	72.0	(19.2)	57.9	(29.7)	77.9	(17.9)	81.5	(26.9)	12	1.38	=0.10
Subject marital happiness (%)	60.7	(20.9)	56.1	(26.7)	63.8	(18.4)	67.3	(33.4)	23	0.97	=0.35
Partner marital happiness (%)	62.5	(23.8)	59.5	(17.4)	59.4	(19.5)	72.8	(25.3)	22	1.56	=0.08

scores of Non-behavioral *Ss* and their partners remained relatively unchanged. The differing number of *Ss* (*N*) listed in Table 2 for the different measures is accounted for by the inherently different number of *Ss* for whom the specific measure was appropriate, i.e. youth, adult, married, as well as by missing data for a small percentage of *Ss*. The treatment period data represent the mean score during the 12 month treatment duration.

## DISCUSSION

Illegal drug use was reduced to a greater extent by the Behavioral program than the Non-behavioral as measured either by urinalysis data alone or by a combination of urinalysis, self-report and report by significant others. The differential decrease occurred for males, females, youth, adults, high-school graduates, high-school dropouts, hard drug users, crack-cocaine users, marijuana users, married adults, unmarried adults and self- as well as agency-referred *Ss*. The differential reduction was greatest for youth, possibly because the youth typically were treated with their parent(s), who participated actively in the behavioral program. The differential effectiveness of the Behavioral treatment was discernible during the second month of treatment when about one third (37%) of the *Ss* were drug-free; by the 4th month, one half (50%) were drug free and about two-thirds (65%) were drug free during the 12th month, vs about  $20 \pm 6\%$  drug-free during each of the 12 months for the Non-behavioral program.

Beneficial changes also occurred on many of the psychological/social measures for the Behavioral program *Ss*. School attendance and employment increased from 52% of the days at pre-treatment to 74% during treatment. Improved psychological functioning was indicated by a decrease in depression. Although no *Ss* were admitted to the study solely for the treatment of alcohol abuse, alcohol use was also reduced; drinking was indirectly treated if drinking behaviors were precursors to illegal drug use, as was often the case. The relationship of the *Ss* with their families also improved. The happiness/satisfaction measure of the parents with the youth *Ss* improved as did, although to a lesser, non-significant degree, the youths' happiness/satisfaction with their parents. Similarly, the marital happiness ratings of adult subjects improved as did the marital happiness ratings of their partners. The improvements in family satisfaction may have resulted from the family communication, social support and contracting procedures included in the Behavioral program, but also possibly directly from the decreased drug use. These improvements in school, vocational, psychological and social functioning may be considered to be at least as important as the observed decrease in illegal drug use, since a major reason for the illegal status of these drugs is the decreased functioning in these areas resulting from the effects of the drugs.

The reduction in illegal drug use was especially large for youth; they averaged 8.9 months of abstinence during the 12 months of the study, vs only 0.6 month for youth in the alternative treatment. This result holds great promise for interrupting drug usage at an early stage. The relatively small number of youth ( $n = 14$ ) included in this study nevertheless requires that this finding be considered suggestive.

*Cost-Effectiveness.* Approximately 19 sessions were conducted over the 12 month period, which would appear to be more economical than the typical costly 30 days of inpatient treatment, especially since the results of inpatient treatment of drug addiction have not yet been reported in controlled outcome studies. Indeed, controlled outcome studies of alcohol addiction by inpatient treatment facilities have failed to show positive results (see review by Miller & Hester, 1986a; 1986b), possibly because of failure to generalize to community life, which is not a problem in the outpatient modality.

The present findings do not apply to post-treatment functioning since treatment was available throughout the 12 month period. Continued treatment may, or may not therefore be necessary for drug-free maintenance. The present procedure showed that sessions can be scheduled relatively infrequently as treatment progresses, and is exemplified by the spacing of sessions an average of 6 weeks apart after 9 months. A viable model may be intensive initial treatment followed by 'booster' sessions only as needed.

The specific procedures in the Behavioral program differed in some respects from those used in previous studies and current practice. *Stimulus Control*: this procedure has been used in alcoholism treatment (Hunt & Azrin, 1973; Sobell & Sobell, 1973) and, as noted by Hester and Miller (1989)



has been used by many behavioral and non-behavioral treatments in the form of advice to avoid drinking situations. The present use of stimulus control differed in that it included a standardized procedure for specifying and monitoring all drug-prone situations, drug incompatible situations, time spent in each day and a daily activities planner chart to promote appropriate activity participation at specified times. *Annoyance Review*: similarly, most drug treatment and prevention programs appear to incorporate educational or 'scare' procedures that provide information regarding the adverse consequences of drug use. The present Annoyance Review procedure differed in that the *subject* provided a written list of negative consequences, with additional prompting by the counselor, as necessary, until a high quantitative rating of 90 or more on a 0–100 scale of aversiveness was obtained for at least 2 consequences. *Contingency Contracting*: Contracting directly and solely for drug abstinence has previously been used such as by Bigelow, Stitzer, Griffiths and Liebson (1981); Stitzer *et al.* (1977); Melin and Gotestam (1973), and Budney *et al.* (1991). Such contracts require an assured means of drug detection such as direct visual observation or a sufficiently high frequency of urine sampling and analysis. Direct observation of the presence of use of illegal drugs is hindered by the very illegality of such usage; the short period of time during which some drugs can be detected with assurance (about 1 day for LSD) would require daily urine testing. Accordingly, the present contracting procedure also specified observable drug-incompatible behaviors as the objective, as had been done in the community reinforcement program for alcoholism (Hunt & Azrin, 1973; Azrin, 1976; Azrin, Sisson, Meyers & Goldley, 1982). *Family Involvement*: Involvement of the family is also typical of current drug treatment programs (and was included in the present Non-behavioral condition), often in the form of 'family days' to keep the family informed as to the client's progress and has been used explicitly to provide marital therapy in behavioral studies of alcohol treatment such as by O'Farrell *et al.* (1984), and Hedberg and Campbell (1974). The present involvement of family support (a) extended to significant others in addition to the spouse or parent, and enlisted the significant other to (b) arrange a behavioral contract to (c) arrange drug-incompatible behaviors to (d) accompany the *S* whenever feasible, (e) to assist and monitor therapy assignments to (f) confirm the *S*'s reports of drug-related or drug-incompatible activities and to (g) provide daily review, praise and encouragement for progress at home. *Urge Control*: Covert Sensitization (Cauteia, 1970) is somewhat similar to the present Urge Control procedure in its imaginal association of aversive thoughts with drug use images and has received some support in the treatment of drug abuse by Wisocki (1973) and Gotestam and Melin (1974). The present Urge Control procedure differed in that it: (a) was devised as an operant, rather than a Pavlovian, technique for imaginal rehearsal of the steps to be taken *in vivo* when proprioceptive, cognitive or affective precursors to drug use occurred; (b) employed ratings of the urgency of the precursors quantitatively, as in Wolpe's (1958) SUDS measure to assure application of the procedure at the appropriate urge intensity; (c) employed natural negative consequences rather than the usual nausea-induced gagging (which many males and most females refused to perform); and (d) interrupted the urge at its earliest discernible level to preclude the need for high intensity interruption (many participants in the preliminary studies reported post-session drug-seeking when a high intensity urge was elicited for rehearsal); (e) imaginal rehearsal was performed in the 'think aloud' format rather than silently which permitted the counselor to monitor and guide *Ss*. Furthermore, (f) the inclusion of a brief relaxation period was designed to reduce arousal and tension associated with drug urges as in Wolpe's (1958) use of systematic desensitization and Goldfried and Trier's (1974) cue-controlled active relaxation techniques.

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